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THE SCHOOL REVIEW
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THE MISSION OF SCIENCE IN EDUCATION

JOHN M. COULTER
University of Chicago

Before determining the method of presenting science in the high school, it is necessary to determine the most valuable contribution of science to education. Perhaps the crux of our differences lies here. If we can agree upon what science should do for us in our work as teachers, we should probably not be very far apart as to the method of securing the result. The variation in method would be no greater than the inevitable and desirable individualism of teachers. If we differ as to the essential contribution of science to education, of course we shall differ as to the methods. The fundamental problem, therefore, is the mission of science in education.

I shall call attention first to some of the results which science is capable of producing, results which are generally acknowledged. It can be used to develop the scientific attitude of mind, which a distinguished theologian recently defined as nothing more than trained common-sense.

This attitude of mind is a spirit of inquiry, which recognizes that we are surrounded by a vast body of established beliefs that need a thorough going-over to distinguish heirloom rubbish from the priceless results of generations of experience. It is also a spirit that demands a close connection between a result and its

claimed cause. Failure to develop this spirit provides the soil in which political demogoguery, destructive charlatanism, and religious vagaries flourish like noxious weeds. It is a spirit that keeps one close to the facts, remembering that a fact is influential only in its own immediate vicinity, and that whole systems of thought and belief lie in a region far beyond the sphere of influence of any facts. In short, it is a spirit that makes for sanity in thought and action, a spirit which is slowly increasing in its influence, but which as yet does not control the majority of citizens. Any subject that can be used to cultivate this spirit is of the greatest practical importance.

Of course the methods introduced by science are now being developed in connection with other subjects, and the same result may be obtained through them; but it still remains true that the scientific spirit just described is more easily and effectively developed in contact with the concrete materials of science.

A stronger claim for science can be made, however, as an essential constituent of all education. It gives a training peculiar to itself, and one that is essential in every well-balanced education. It is this contribution that I wish to emphasize. I shall assume that any peculiar result of science in education must be obtained, not through information in reference to the facts of science, but through contact with the materials of science. However valuable information may be, it can hardly be regarded as a substitute for knowledge. Information is always at least second-hand, while knowledge is first hand. The real educational significance of personal experience, which is a better name for what we call the laboratory method in education, is very commonly overlooked, even by teachers of science.

We were first told that science teaches the laboratory method, the inference being that the content of science is of no particular educational advantage in itself, but is merely useful in teaching a valuable method. Of course this method holds no more relation to science than do algebraic symbols to algebra; they both represent merely useful machinery for getting at the real results.

Then we were told that science cultivates the power and habit of observation. Of course it does, but this is not peculiar to

training in science, for it belongs to any subject in which the laboratory method is used. Then it was claimed that the study of science trains the powers of analysis. This is certainly getting the subject upon higher ground, for the power of analysis is of immense practical importance, but to imagine that analysis is the ultimate purpose of science in education is not to go very much farther than to say that the ultimate purpose is the laboratory method. The latter is the method, the former is but the first step in its application and is by no means peculiar to science.

Beyond analysis lies synthesis, and this certainly represents the ultimate purpose of science. The results of our analysis are as barren as a bank of sand until synthesis lays hold of them; but even synthesis is not peculiar to science. To pass by the incidental and the temporary, and to reach the real and permanent contribution of science to education is to discover that it lies, not in teaching the laboratory method, in developing the power of observation, in cultivating the spirit of analysis, nor even in carrying one to the heights of synthesis, but in the *mental attitude demanded in reaching the synthesis*. In this regard the demands of science are diametrically opposed to those of the humanities, for example, using this loose term to express the great region of literature and its allies. The general effect of the humanities in a scheme of education may be summed up in the single word *appreciation*. They seek to relate the student to what has been said or done by mankind, that his critical sense may be developed, and that he may recognize what is best in human thought and action. To recognize what is best involves a standard of comparison. In most cases this standard is derived and conventional; in rare cases it is original and individual; in no case is it founded on the essential nature of things, in absolute truth, for it is likely to shift. It is the artistic and aesthetic which predominates, not the absolute. The whole process is one of *self-injection* in order to reach the power of *appreciation*. Any education which stops with this result is incomplete, for there is another mental attitude which is a necessary complement before a full-rounded education can be claimed. This complementary mental attitude is developed by a proper study of science.

If the study of nature is conducted so as to cultivate chiefly a sentimental appreciation of natural objects, it is merely more of the same thing. If it is conducted so as to store the memory chiefly with encyclopedic information, it misses the high level of its educational opportunity. If the proper intellectual result of the humanities is *appreciation*, whose processes demand *self-injection*, the proper and distinctive result of the sciences is a *formula*, to obtain which there must be rigid *self-elimination*. Any injection of self into a scientific synthesis vitiates the result. The standard is not a variable and artificial one, developed from the varying tastes of man, but absolute, founded upon eternal truth.

Two such distinct mental attitudes as self-injection and self-elimination must receive attention in education, which cannot be complete without both. They are not contradictory, but complementary. The exclusive cultivation of either one must result in a lopsided development. Persistent self-injection tends to mysticism, a confusion of ideals, or even vagaries, with realities—a prolific cause of all irrational beliefs. Persistent self-elimination narrows the vision to a horizon touched by the senses and clips the wings that would carry us now and then beyond the treadmill of life into a freer air and a wider outlook. The two processes and the two results are so distinct and so complementary that any scheme of education which does not provide for the definite cultivation of these two mental attitudes is in constant danger of resulting in mental distortion.

This seems to be the great and unique mission of science in the education of men and women, and nothing more superficial or temporary should divert us from it. It is men and women we have in mind, and not science, or the various subjects under which it is organized. It is obvious that this mission must reach the greatest number, and therefore its beginnings cannot be deferred to the educational schemes of colleges and universities, where the small minority are in training. This work, therefore, is a high-school problem. We face the question as to the most effective method of accomplishing it.

The problem is peculiarly difficult because it has been much confused by the various standards used to measure the results.

In the main these standards have been too concrete, such as the immediate effect of science upon the earning capacity of the student; the amount of useful information a student may carry into his subsequent life; the number of ordinary phenomena the student can pretend to explain, etc. Too often the higher intellectual standard is lost sight of, the standard of a mind trained to an effective attitude toward all subjects, an attitude that persists when unrelated facts are forgotten.

This confusion becomes worse confounded when incompetent teaching enters into the program, and the obvious results of lack of interest, and lack of any practical or intellectual outcome, are referred to science as a subject rather than to the teacher as an incompetent. From the midst of all this confusion, leading to merited criticism and a babel of opinions, there emerge some facts which seem clear.

Science has become so vast and so complex a subject, and, in addition to this, is so growing a subject, that no teacher can command even its most elementary everyday phases. There was a time when men taught natural science; there is no man who can do this now. If the most obvious facts of science are to be presented truthfully, they must be presented by teachers trained in the various fields of science. If much confusion has arisen from teachers incompetent in some field of science, the amount of confusion that would result if the same group should attempt to teach *all* science must be left to the imagination. Of course, in our everyday experience we face nature as a synthetic affair, but you must remember that synthesis is the last step in progress and is an impossible first step. This means that we must begin by laying hold of single threads and following them, until finally we see them woven into the intricate pattern we call nature; and this is the process that brings appreciation, insight, and intellectual equipment; the process that enables science to achieve its peculiar mission in education.

An illustration may be taken from another synthetic experience, common in large cities, as in Chicago, for example. Almost all the living languages are represented in its population, and yet it would hardly seem rational to teach a child all foreign languages at once,

by picking out the commonest words and phrases from each. The result might be some scrappy information, but to call it education in language would be far from the mark. The real synthetic study of language is philology, based upon some organized knowledge of the different languages.

A division of the materials of science seems necessary, therefore, not only to secure competent teaching, which is a practical reason, but also to secure a point of view that represents the permanent possession which is the essential feature of education. This does not mean organization for the sake of a subject, but for the sake of a pupil; an organization which means a structure that abides, and not inchoate building material.

I sympathize fully with the demand that the materials selected should be more related to the experience of pupils. This is common-sense, and therefore science. I confess that this has been too much lost sight of in our zeal to organize knowledge so that it may be permanent; but the material selected may vary, while the use to which it is put remains the same. The appeal to experience for our material, and the use of this material in organizing a definite body of knowledge, is the combination that will retain all that is vital in our past teaching and admit all that is helpful in the new demands.

Experience teaches us many things, and changes must be made that will satisfy every possible need, without destroying things that are more important. A tree may be made to yield more and better fruit by pruning and grafting, but not by uprooting. My picture of the situation in science teaching is that of a tree, rooted and grounded in all the good that the past has revealed, but reaching out its branches and ever-renewed foliage to the air and the sunshine, and taking into its life the forces of today.

I have met hundreds of students, entering the university from all parts of the country, who have had work in science in high schools, and although the results have been variable, they have been in the main so satisfactory that it is clear to me that science teaching in the high schools has not been a failure. Those who state it is a failure must mean that it has not been as successful as it is capable of being made. I have been interested in tracing the comparative failures to their sources, and invariably I have encountered incompetent teaching as the responsible cause, rather

than the materials of science that have been presented. The majority of cases, however, that have come under my observation are not failures, for they have brought to me a substantial foundation upon which to build, and, what is more important, an aroused interest of their own to build upon the school foundation.

It may be asserted that this evidence is very partial, since it includes only the select few who pass from the high schools into the universities, while the major product of the high schools passes directly into the activities of life. Just how this dissolving crowd can be followed and estimated I am at a loss to imagine. Of course, general impressions are current, which are propagated from no definite source of reliable data. For example, I have heard a business man condemn the whole system of high-school education because of an unhappy experience with one high-school graduate. Nothing is more common than such illogical generalizations, and they may become propagated so extensively as to be regarded finally as a "public demand." The average "public demand" is about the vaguest scientific proposition one ever encounters.

It has been assumed by some that the large majority of high-school students need a type of science instruction entirely different from that which has been given. This assumption is either a response to public demand or a pedagogical abstraction, and in neither case can it rest upon a convincing body of evidence.

Some of the implied criticisms of the present methods are rather difficult to be understood by one who is merely observing the discussion, rather than participating in it. For example, if any science teaching deals with "abstractions" and "generalizations" rather than with concrete material, it is not science teaching. That there should be a certain amount of generalization, based upon observed facts, is obvious, for this is making facts live, which is the pedagogy of the subject. That our science teaching should consist only in explaining to a student what he encounters in his own experience is to limit his life, rather than to enrich it by extending his horizon. There are many things worth knowing which we begin to experience only when our attention is called to them.

Perhaps, however, the best expression of the opinion that the current method of teaching science should be changed entirely is to be found in the recent texts on "general science." I find myself

quite in accord with the motive of what is called "general science," in so far as it voices a growing opinion that high-school students should know more about science in general and tries to meet this opinion with a method. What I cannot agree with is the method, and for reasons indicated in a general way in the preceding part of this paper. A mosaic made up of fragments of information breaks up all natural connections and forbids the development of those ideas which relate and hold facts. As I have said, it seems to be really a substitution of the encyclopedic for the educative. The relations suggested by a mosaic are purely artificial and never can develop a body of *knowledge*, as contrasted with a body of *facts*. With me this is a matter of pedagogy, that is, of the child, and not at all of the sciences as partitioned off into different fields. These sciences can take care of themselves, but we must make them render the best possible service in the education of children.

As one advances through a university, the subjects of science become more and more subdivided, on account of our rapidly growing knowledge. Subdivisions of this kind have no place in elementary instruction, but there are groups of these subjects which are units, so far as education is concerned. It is these natural educational units that must be preserved (and they are not numerous), if science is to do its perfect work in education. I do not understand how an inextricable tangle of these units can be regarded as an education *in* science; certainly it is not an education *by* science.

Of course, when these few natural units are segregated, and perhaps called by names indicating that they are not specialized sciences, then the common experience of life should enter into the choice of illustrative material. We cannot meet the demand for more general acquaintance with science by putting all the sciences into a short course. Such a general acquaintance can be obtained only by extending the time given to science instruction. My program, therefore, would be: enough time for science, so that its natural units may be developed, and also better teaching all along the line.

THE PRESENT STATUS AND REAL MEANING OF GENERAL SCIENCE

FRED D. BARBER
Illinois State Normal University

One characteristic marks off the nineteenth century from all preceding centuries in the world's history. That characteristic is the achievements of science and man's mastery over the forces of nature. The nineteenth century opened with such means of transportation and communication only as were enjoyed by Abraham when he journeyed into the land of Canaan. Under such conditions man perforce through all the centuries of his existence had led an isolated life. Within one century time and space have been all but eliminated and the whole civilized world has become a single social unit.

A second phase of the achievements of science was the recasting of all the activities of daily life. The achievements of science during the last century completely revolutionized the home, the school and its surroundings, every phase of country, town, and city life, all methods of heating and lighting, ventilation, and sanitation, of obtaining food and clothing—in fact, they revolutionized all activities of modern life. To fit into this modern world anywhere understandingly, some knowledge of the living world and the physical forces about us is a necessity. The social significance of science in modern life gives it ever-increasing importance as a subject in our public-school curriculum.

Again, the content of our knowledge concerning the natural world and physical forces is increasing with a rapidity and a certainty almost beyond the comprehension of the human mind. For convenience, the mature scientist, viewing this new world of knowledge philosophically, divides it into many so-called special sciences, and the mature student aspiring to do research work and make some contribution to our fund of knowledge necessarily

confines his study to some small portion of a *single* science. Moreover, he can hope to succeed only by acquiring the technique of the specialist.

The great mass of humanity, however, those engaged in the world's work, laboring in the humbler walks of life, in production, as in agriculture, horticulture, gardening, stock-raising, or in mining, or in the manufacturing industries, or in trade and commerce, or even in many of the professions—these people have slight need of such special training and technique. They need instead an insight into the broad general principles of science and above all they need to see clearly and to comprehend the significance of science as it spins and weaves the social fabric of modern civilization.

SCIENCE MUST BE DISSEMINATED

To neglect the training of research workers in the field of science would be fatal to further progress in man's control of Nature and her forces. It would mean stagnation in material progress and that must ever mean stagnation in mental, moral, and spiritual progress. But, on the other hand, to neglect the interpretation and dissemination of scientific knowledge and the training of the masses of common people in scientific thinking is to rob humanity, in a large measure, of the fruits of scientific research. It is to the interest of all humanity that even the humblest laborer, toiling with pick and shovel, shall have some knowledge of the laws of science as related to his labor and his living. Modern civilization and all that is most significant to the common people in the way of improved living conditions, of more efficient labor, of shorter hours of labor, and of greater facilities for recreation and pleasure, depend largely and primarily upon, first, the achievements of the research worker in revealing the truths of science, and second, the dissemination of those truths among the common people and the training of the masses in thinking scientifically.

We are confronted today with no danger of neglecting the training of research workers in the field of science. Every great university in the land is chiefly engaged in this work. The ablest men in their science departments are spending their energies largely in training research workers in their graduate departments. The

undergraduate departments of these universities and most of our colleges are largely engaged in preparing students to enter these graduate schools, while the science courses in our high schools are, in the main, shaped and determined by college-entrance requirements. Our high schools are vestibules to the college; our colleges are vestibules to the graduate school of the university. From top to bottom and from bottom to top the science work in our educational institutions is chiefly shaped and planned to furnish a direct path for the training of research workers. It is necessary that such a path be provided; but, we must not lose sight of the fact that it is equally necessary that the needs of the masses of young people, preparing, not for research work, but for the ordinary activities of life, receive some consideration. Science falls far short of fulfilling its mission unless the fruits of scientific research fall upon fertile soil and take root in the daily-life activities of the masses.

Are our educational institutions preparing the masses to appreciate and utilize the products of research work in science? This can be done directly and efficiently only through science instruction in our public schools, where the masses of young people should learn to interpret and to understand the significance of science as it affects their life-work—to think scientifically as they work. They need *less* the scientific thinking of *meditation;* they need *most* the scientific thinking of *participation* in the fundamental activities of modern life. And where are our great educational institutions which stand out conspicuously for their efforts and accomplishments in the training of science teachers for our public schools? Where are our great universities which emphasize the art of interpreting and disseminating the fruits of scientific research as they emphasize the art of research itself?

In commenting upon the tendencies in our high schools the Commissioner of Education in his report, 1911, reviewing the educational progress of the decade, says: "Latin is holding its ground; French and German are gaining; algebra occupies a large share of time and is steady; geometry is gaining; English and history have gained materially; all the older sciences, rather strangely, are relatively falling off."

At last we are waking up to the situation. We are beginning to realize that something is wrong—radically wrong—with our public-school work in science. What is the trouble? Have you diagnosed the case? Have you a remedy to suggest?

OVERSPECIALIZATION

Some of us are convinced that the malady from which the public-school science is suffering is directly traceable to an overdose of specialization. The needs of the research specialist are dominating and determining largely the college courses in science; college-entrance requirements almost completely determine the character of our high-school courses in science. We have built our science courses from the top downward. We have attempted to start every fourteen-year old boy and girl entering the high school upon the path laid out for the benefit of the exceptional boy or girl who may become a research worker in the university. We have presumed that every fourteen-year-old youth is eager and ready to think in abstract terms. We have attempted to feed him on abstract principles and generalizations, never pausing to inquire about his likes and dislikes or to study the fundamental characteristics of the adolescent mind. We have failed to note that boys and girls of fourteen are chiefly interested in learning things for the sake of knowing those particular things. The adolescent is not yet a philosopher. Abstractions, generalizations, and type-studies are foreign and distasteful to the normal adolescent mind. Youth is ambitious, but it ever seeks the short cut. Necessity also plants its iron heel firmly down upon the ambition of the youth from the toiling classes. The wail and clamor from hungry mouths, the pleadings for the necessities of life are ever ringing in his ear, and in the ear of his parents. If he enters the high school at all it is generally for the purpose of spending one or two years, possibly three or four years, in better preparing himself for life's work—for the struggle of earning a living. The boys and girls from the laboring classes, indeed, from the masses of the common people everywhere, as well as their parents, have a right to demand that they be shown the worth-whileness of the tasks set before them. Can our high-school principals and science teachers do this successfully

while following the usual courses in special science shaped and planned chiefly for a different purpose?

PRESENT STATUS OF GENERAL SCIENCE

At the request of the chairman of the science section of the National Education Association I undertook last summer to discover the status of what is known as general science. I endeavored to ascertain where and in how many high schools courses called general science were being taught, and later to obtain from the principals of some of those schools information as to what they were attempting to do and with what measure of success their efforts were meeting.

About June 1, 1914, a questionnaire was sent to 180 schools which are among those reported as offering a course called general science. With few exceptions these were addressed to the principals. Up to June 25, replies from 73 schools had been received. All the questions asked were framed with the idea of stimulating thought rather than obtaining ease of tabulation. Some of the replies were consequently rather difficult to tabulate, but it is the belief of the writer that a truer expression of ideas was obtained. A copy of the questionnaire with a summary of the replies is appended to this paper.

A complete analysis of this report is unnecessary. Facts, if correctly reported, are facts, and therefore undebatable. They are, nevertheless, of the greatest value since they furnish the only reliable basis for opinion. I shall call attention to but two items under the questions of fact. First, in replying to the second question, regarding the length of the course given, it will be noted that but one school reports a course in general science more than one year in length. I predict with confidence that a similar investigation ten years hence, possibly five years hence, will reveal many schools offering general science courses at least two years in length. Second, in reply to the sixth question, regarding texts used, it will be noted that eleven different texts were used in giving these so-called general science courses. To one at all familiar with the science texts available during the school year of 1913–14 the answer to this question, together with the answers to the tenth question in

the second list, indicates that up to that date, at least, no generally satisfactory texts had made their appearance. I am also convinced that for some years to come, at least until there is available a supply of teachers especially trained to teach general science, textbooks presenting well-organized courses will be as necessary in general science as they are in special science or in any other subject offered in our high schools. The greatest need today, one felt keenly by every science teacher who has become convinced that our science teaching has become too highly specialized, is for organized courses in general science. Furthermore, however true it may be that the best science teaching, at least in the first high-school year, is merely the teaching of the science of the pupil's environment, it is asking the impossible when we ask each teacher to organize such material and put it in teachable and available form.

Passing to the questions of opinion: Opinions are always debatable but the answers to the first and second questions indicate clearly, to my mind, that thus far the experiments with so-called general science have very generally met with the approval of the principals of the schools in which they have been tried. It was most interesting to me to discover that the only person answering the first question in the negative answered the second question in the affirmative.

In my judgment the most significant question in the entire set was the sixth in the second list: "Should the units of instruction in general science differ materially from those in special science?" And yet there were fewer answers to this question than to any other. The term "units of instruction" seems not to have been understood by many. From the replies one is warranted in concluding that many of the respondents have no clearly formulated ideas regarding the real nature and real significance of the general-science movement. Science organized and developed into units of instruction not materially differing from the units of instruction in special science can be nothing other than special science. To attempt to organize science material without recognizing the fundamental difference in the organization of special science and general science is certain to result, it seems to me, in a mere collection of loosely related principles picked from the various special

sciences. Those principles may be the most interesting and striking principles of the special sciences and yet such a course might easily have considerably less significance as educative material than any course in special science. In my judgment most of the so-called general science being offered today is merely fragmentary special science and of exceedingly doubtful educational value.

General science as conceived by its leading advocates is quite as much a different mode of organization and a different mode of attack as it is a new and different selection of material. Much of the material which has thus far appeared in texts called general science consists of clippings from the special sciences. To a less extent the same is true of the half-dozen unpublished outlines which I have received. In many cases little or no unifying idea, giving the unit of instruction significance and educational value, is evident. In my judgment, the advocates of special science, with justified reverence for logical thinking, and training in scientific thinking, may well call such a course "hodgepodge" and dub it "a spineless wonder."

If general science is to be of educational value, it must consist of well-organized units of instruction. These units must be as definite and as well organized as are the units of special science. They will differ, however, from the units of special science in the fact that they are fundamentally units of practical science or applied science instead of units of theoretical science. The core of the unit in general science will be some process or some device utilized by the individual or by society in the ordinary activities of modern life. To illustrate: In the special science physics, under "Light," we find such units as these: "Light, Its Rectilinear Propagation; Shadows; Photometry and the Law of Reflection; Mirrors and the Formation of Images; Refraction of Light; The Formation of Images by Lenses; Optical Instruments; Color and Spectra; Nature of Light; Interference and Polarization." In marked contrast, general science adapted to the ninth grade will be developed through units of instruction somewhat of the following character: "Primitive Lamps; Candles; How the Candle Burns; Discovery of Petroleum; Kerosene Lamps; How Kerosene Burns; Evaporation,

Boiling-Point and Distillation; Crude Petroleum; Distillation of Petroleum; Gasoline; Why Gasoline Is Dangerous; Inspection of Oils; Cautions in Using Kerosene and Gasoline; Gasoline Lamps; Gasoline Gas; Illuminating Gas; Distillation of Coal; Coal Gas; Water Gas; Acetylene Generators; Acetylene Lighting; Electric Lights and Electric Lighting; Natural Lighting of Rooms; Direct and Diffused Light; Importance of Diffused Light; Intensity of Light Required; Cost of Artificial Lighting."

A course in general science, properly conceived, has unity and logical development. It has educational value of the highest order. It is adapted to the adolescent mind and at the same time appeals to the pupil as worth while. It trains in scientific thinking and deals with material with which the pupil is already somewhat familiar. It starts with the known and proceeds to the related unknown. It deals only with the concrete because the significant is always concrete. It gives the pupil control of his environment and an appreciation of the significance of science in modern life. Such a course in science study is *general* because it disregards the artificial boundaries of special science. To study tallow or paraffin candles, the material of which they are made, how they are made, how they burn, and their significance in the development of civilization, involves material from several different special sciences. The units of applied science are never drawn from the field of a single special science. The science involved in raising corn on the fertile plains of Illinois involves some knowledge of the character of the soil itself, geology, some knowledge of the structure and composition of the soil, soil physics and soil chemistry, some knowledge of plant life and plant growth, botany, some knowledge of the weather and climate, meteorology, and some knowledge of insect life, zoölogy. Why do we insist that the pupil be eternally separating these elements of nature—these items of his natural environment—which the Creator has so marvelously and wondrously fitted together into a perfect whole? Why do we insist that he forever and eternally be separating them from their natural, logical, and necessary relationships and placing them in the man-made category of special science? Is there less education, less mental training, less scientific thinking, or less culture in seeing and comprehending

the units of nature as designed by the Creator than by seeing and comprehending the units designed by man?

THE PLEA FOR SPECIAL SCIENCE

Occasionally we hear an advocate of special science in the high school presenting his case. While admitting that science instruction in the high school may, at this time, very justly have been called to the bar of public opinion, he still insists that science instruction is improving daily, that the rank and file of science teachers will soon be so prepared that they can present special science in an interesting and profitable manner. He closes his argument with the statement that to substitute general science for special science in the early years of the high school at this time would completely upset the entire course in science, set science in the high school back a generation, and inevitably mean a great and deplorable loss for the cause of education.

I never hear such an argument without recalling another case which is recorded in that delightfully written volume *The Biography of Thomas Wentworth Higginson*, by Mary Thacher Higginson. Not long after the close of the Civil War a very attractive young woman appealed to Mr. Higginson to attempt to secure a pension for her on the grounds that she was the daughter of a certain man, that he was a Union soldier, and that he died of starvation and exposure in a Confederate prison. Mr. Higginson, after a careful and thorough investigation, summed up the case. He announced that he found the case a difficult one to handle. The beauty, brilliancy, and culture of the girl were all in her favor, but there were three strong points against her case which would be difficult to overcome: first, she was not the daughter of the man as represented; second, the man never was a Union soldier, and never was in a Confederate prison; third, the man was still living, well and hearty. He concluded to drop the case.

Now, as I understand it, the theory is that special science is the only science instruction having any considerable cultural and educational value—that it is only when the great truths of nature are thus presented that one can see the natural and physical world as a unit and in its logical order, and, finally, that it is only when one

thus studies nature that one acquires the truly scientific spirit. This theory, while beautiful, brilliant, and attractive, must also be considered in the light of some cold, hard facts when applied to adolescent minds in the early years of the high school.

First, the adolescent mind demands no such view of nature as will enable it to see either the unity of the universe or such unity of portions of the universe as presented in the typical special science. The child mind is not the mind of the philosopher. The adolescent mind demands merely an explanation—a simple, common-sense explanation—of his environment, a working explanation of the here and now.

Second, special science, as usually developed, deals chiefly with abstractions and generalizations. These are usually arrived at through type-studies. The best and most striking types are often found outside of (shall I say, rarely within?) the range of the pupil's past experience. The material placed before the student may have the semblance of concreteness but in reality it lacks concreteness because material is concrete only when it has significance and meaning in the light of past experience. No matter how concrete in form material may appear to the teacher with his more mature mind and richer experiences, if it lacks significance in the pupil's past experiences it is to him abstract and consequently lacks interest.

Third, special science has had its trial in the early years of the high school and has failed. It has, in a large measure, failed to interest the pupil; science teachers generally regard it as more or less of a failure; superintendents, school boards, and especially thinking patrons and hard-headed business men have lost faith in it and are demanding a change in science teaching as well as in other phases of high-school work. While the significance and importance of applied science in modern life have multiplied many fold, science instruction has steadily declined during the past twenty years. If the rate of decline continues at the past rate for another twenty years, science will then occupy but an insignificant place in the high-school curriculum.

We cannot much longer disregard these potent facts and cling to the theories of specialists and research enthusiasts when shaping

science courses for fourteen-year-old boys and girls just entering the high school.

GENERAL SCIENCE IS CONCRETE

Science may be organized into units having practical application and more or less utilitarian values for a basis with *exactly* the same logical sequence as when organized in accordance with purely theoretical considerations. The science involved in the production and use of light from pine knot and grease lamp of primitive times to the most modern methods of lighting may be as well organized as, and will require the same logical thinking and be of even greater educational value than, is the organization of the material usually presented under the head of light in the special science, physics.

When science is organized upon the basis of practical application and utilitarian values, only significant material is required. Our textbooks in special science today are, in a great measure, loaded down with non-significant and therefore abstract and uninteresting material introduced solely because of theoretical considerations. As a teacher of physics principally engaged in teaching students of secondary-school attainments, I assert with confidence that at least one-third of the subject-matter in the ordinary physics text may be omitted without practical loss to the average high-school student and with a positive gain in interest.

ORGANIZATION OF GENERAL SCIENCE

I repeat, the significant material of science may be organized into units of instruction presenting as much of logical order and sequence as is to be found in special science. Consider physics for a moment: There is no accepted order of topics in physics. Some texts begin with the mechanics of solids, some with a study of liquids. In some texts sound is presented early in the course; in others it comes late. In every physics text there are complete breaks in the logical sequence, as, for instance in passing from heat or sound to static electricity. Several popular texts have even divided the usually accepted units, presenting a portion of the topic early and the more difficult portions later in the course. An examination of the thirty or forty texts in physics published during

the past twenty-five years will convince any fair-minded person that there is no necessary or accepted logical sequence of topics in the subject of physics. The same lack of accepted sequence is equally evident in chemistry. About thirty years ago the order of topics in zoölogy suffered a complete reversal. Previously the higher forms of life had usually been treated first and lower forms last. Man was the first topic studied and the amoeba the last. An examination of all the texts of special science published during the past half-century would prove conclusively, I believe, that authors never have recognized and do not today recognize as necessary a certain sequence of topics in special science. Of course, within a given unit of instruction a logical sequence is observed, but history proves that special science demands neither that a certain fixed and unvarying set of topics be treated nor that those which are treated shall be studied in a fixed and unvarying order.

Now the general science advocated today violates no accepted principle of science teaching in proclaiming that there is no single set of topics which should be treated in every school and every class, and further that there is no set and unvariable order in which the topics chosen may be treated. In these respects special science never has been universalized and it is to be hoped that general science may never be universalized. Nevertheless, science to be significant and concrete must reveal to the pupil his environment in its true significance. Now there are certain phases of environment which are universal or nearly so. These phases of environment may be organized and developed into a course in science. If organized in accordance with the basic principle of revealing their utilitarian, social, and economic values, and without material reference to the theoretical considerations of special science, I believe we shall have organized a course in what progressive educators now call general science. Such an organized course will differ materially from our usual courses in special science as regards both the materials used and the mode of presentation.

A COURSE IN GENERAL SCIENCE

It is my conviction that the first year, probably the first two years, of science in the high school should be organized as general

science as interpreted above. Our plea is not for an easy, a "snap," course nor a sentimental, namby-pamby course, but rather for a course full of meaning and value, and one which will enlist the interest and demand the best effort of the pupil. It must rest upon a historical setting and reveal to the pupil something of the social and economic value of science in modern life. It must put him so far as is possible in control of his environment. It must recognize the nature of the adolescent mind and must appeal to the pupil and to his parents as worth while.

When we recognize these fundamental principles and reorganize and adapt all our high-school courses to them; when we recognize the needs of the millions of young people who will never see the inside of a college or university or even complete a high-school course; when we give up the idea that we must attempt to make profound scholars out of all the boys and girls of the generation or, failing in this, crowd them from the high school; when those in charge of our public high schools come to recognize the fact that the greatest service they can render is to make their high schools of such a character that they will attract and hold the great mass of young people till they can be trained into fairly intelligent, self-supporting, and self-respecting citizens, then and not until then may we hope to see high-school mortality lessen and science in the high school again assume the relative position which its importance in modern life justifies.

QUESTIONNAIRE ON GENERAL SCIENCE

FRED D. BARBER

ILLINOIS STATE NORMAL UNIVERSITY

Sent Out June 1, 1914, to 180 Schools. Replies to June 25, 1914, from 73 Schools.

I. QUESTIONS OF FACT

1. How many years has general science been taught in your school?
   Answers: One year, 26; two, 13; three, 7; four, 3; five, 2; seven, 1; ten, 3; sixteen, 1.
2. Please state the length of the course, or courses, in months.
   Answers: Five months, 21; four, 4; eight, 2; nine, 20; ten, 13; two years, 1.
3. How many hours per week are given this subject?
   Answers: Two hours, 1; four, 7; five, 43; seven, 10.

4. In what year, or years, of the high school, or in what grades, is this work offered?

Answers: Eighth grade, 6; ninth grade, 62; tenth grade, 7.

5. Is the work elective? or required of certain students? or required of all students in some certain grade or course?

Answers: Elective, 22; required in certain courses, 13; required of all, 30.

6. Is a textbook used? If so, whose?

Answers: Texts (11 different texts used), 51; notes and outlines, 13.

7. If no textbook is used, can you send me a set of notes or an outline of the course?

Answers: Outlines received, 8.

8. Is your course based upon or built around the material of a particular special science, such as physiography, botany, physics, or physiology? If so, which science?

Answers: No, 34; physical sciences, 22; physiology, 3; biology, 1; physiography, 1.

9. What was the motive (or motives) which induced the teacher or school authories to introduce general science rather than to follow the lines of the older special sciences?

Answers: Foundation for later science, 17; school mortality, 13; to make sciences practical, 11; aid in choice, 3; special science unadapted to ninth grade, 6; failure of special science, 3; practical work, 8; shorten course, 2.

10. To what extent is your course in general science textbook work?

Answers: Largely, 27; partly, 17; little, 11.

11. To what extent is your course field work?

Answers: Some field work, 30; none, 16.

12. To what extent is your course laboratory work?

Answers: Largely laboratory work, 19; partly, 37.

13. If you have laboratory work, to what extent is it carried on as demonstration by the teacher? To what extent is it laboratory work by the student?

Answers: Mainly by teacher, 36; mainly by pupil, 33.

14. Please state any other fact of material importance regarding the course.

Answers: Replies from 24. Too varied to tabulate. Frequent statements:

1. Work regarded as successful and will be continued.
2. Increased enrolment in later sciences.
3. Disagreement regarding value of teachers' demonstrations vs. pupils' experimentations.
4. Greater attention given English than special sciences.

QUESTIONS OF OPINION

1. In your judgment, has the work in general science been a success?
Answers: Yes, 47; decidedly so, 13; doubtful, 4; no, 1; don't know, 2.

2. Has its degree of success been greater or less than might have been obtained from systematic, special science in the same grade taught by the same teacher?
Answers: Greater, 49; doubtful, 7; don't know, 1; not the question, 1; answer later, 2.
Please explain why.
Explanations, 53. Too extensive and varied to tabulate.

3. What, in your judgment, is the best reason (or reasons) for substituting general science for special science in any grade or in any year of the high school?
Answers: Replies, 66. Frequent reasons: (1) more interesting; (2) mortality in high school; (3) foundation for later work; (4) starts scientific spirit; (5) flexibility of the course; (6) not a substitute but a basis for special science; (7) adapted to adolescence; (8) shortens course for certain students; (9) offers more varied training.

4. In your opinion what material, in general, physical science material or biological material, should predominate in such a course if it is to be taught at all?
Answers: Physical science, 25; biological, 7; equal, 10; not the deciding point, 26.
Please explain why.
Explanations, 56. Too varied to tabulate.

5. What, in your judgment, should be the unifying idea or principle in a course in general science if it is to be given?
Answers: Control of environment, 29; scientific spirit, 14; foundation for later sciences, 4; unity unnecessary, 3; information, 2; scattering, 12.

6. In your judgment, should the units of instruction in general science differ materially from those in special science?
If so, in what respect should they differ?
Answers: No, 29; yes, 16; all one unit, 1; emphasis on practical units not theoretical, 1; only in degree of specialization, 1.

7. In your judgment, is general science more difficult or less difficult to teach well than special science?
Answers: More, 35; less, 14; same, 5; both, 2; depends on teacher, 5.
Please explain why.
An almost universal explanation: Makes a larger demand on the teacher, but the pupil is more interested, thus compensating.

8. From your experience, do you consider general science more or less interesting than special science in the same grade?

Answers: More, 51; less, 1; in doubt, 1; depends on teacher, 2.

How do you account for it?

Very few explanations.

9. Which do you consider more profitable for the student, general or special science?

Answers: General, 36; special, 3; depends on pupil's purpose, 9; each in its place, 10; in doubt, 5.

Why?

Explanations from 60. Nearly all agree that both are necessary.

10. The objection has been raised that general science is likely to assume a somewhat definite and unified form and be generally taught only as its content and mode of presentation are determined by textbooks which have appeared or may appear in which such courses are worked out in detail. Do you agree or disagree with this view?

Answers: Agree, 23; disagree, 14; in doubt, 13.

If the above statement is correct, and if texts in general science do appear which appeal generally to science teachers as suitable, thereby, in fact, determining the course in general science, would you regard this fact as foreboding ill for the cause of education?

No, 49; yes, 5; possibly, 4.

Why?

General agreement that same danger is confronted in most subjects.

11. In your judgment, could general science be made a success in the average school in the upper grades, say the seventh and eighth, as schools are generally conducted today?

Answers: Yes, 24; no, 35; doubtful, 7.

Please explain why.

Explanations: "It has been done in some places"; "It has proven a failure in general"; teachers are not prepared; no laboratory facilities; departmental supervision would make it possible; the six-six plan would make it possible; would crowd out necessary work in the grades.

12. Could general science be handled with as much success as special science in the first year, or first two years, of the average high school as such schools are equipped today?

Answers: Yes, 51; with adjustments, 2; only in small schools, 1; no, 7.

13. Will you kindly suggest a possible arrangement of high-school science courses including a course or some courses in general science?

Answers: Courses of study in science for the high school suggested, 41: many apparently adapted to local conditions; suggesting two years of general science, 2; suggesting that two sciences might be be taken at the same time, 1.

THE JUNIOR HIGH SCHOOL

CHARLES HUBBARD JUDD
School of Education, University of Chicago

In an editorial on the "Six-Six Plan" in *School and Home Education*[1] of September, 1914, Professor Bagley has raised in a very pointed way the question whether the cutting-off of the last two years of the elementary school is not going to interfere with the most important function of the elementary school, which function he describes in the following terms: The function of the elementary school is that of "insuring among our people not only a common basis of certain intellectual skills such as the number arts and the language arts, but also, and more significantly, a common basis of certain ideas and ideals and standards which go a long way toward insuring 'social solidarity,' . . . . *a basis of common feeling and common thought and common aspiration which is absolutely essential to an effective democracy.*"

Professor Bagley thinks that there is danger that a course of school training which begins to differentiate after the sixth grade endangers the democratic purpose of the common school.

In the October issue of the same journal he returns to the topic while discussing the Springfield survey. He takes Mr. Ayers to task for the way in which the survey has supported its advocacy of the six-six plan. The following quotation covers the questions which are of interest to us at this time:

> The Springfield survey, for example, in recommending the "six-six" plan (or the "six-three-three" plan), advances only three very trivial arguments against it, saying nothing of the evils that may possibly be involved in shortening by two full years the period of "common" education, and making no provision, so far as we can see, for counteracting the inevitable tendencies toward differentiation in the seventh and eighth years.
>
> These omissions, however, are of slight significance in comparison with the misleading character of one of the statements adduced in support of the plan. We read: "The present administrative division of schools into eight elementary

[1] Vol. XXXIV, No. 1, pp. 3–5.

and four high-school grades is illogical and is based on the accidents of history. We are the only great modern nation that has such a division. England, Germany, France, and Japan have developed systems better adapted to the psychological nature and needs of the child" (p. 118).

A statement of this sort is thoroughly misleading. What does it mean? On the surface one would infer that the countries in question have adopted the six-six plan, or something akin to it—which is not true. The real difference between our school system and that of Germany, for example, lies in the fact that our system constitutes an "educational ladder" open to all upon the same conditions, while Germany's system is differentiated from the outset—*not on the basis of "psychological needs," but on the basis of social castes.* The fundamental difficulty in readjusting our educational system lies precisely at this point: Shall the United States go the way of European nations and recognize in its public schools the existence of social and economic strata, or shall it continue a type of school organization that is admirably adapted to perpetuate the ideals of democracy and equal opportunity? This is the question that ought to be put fairly and squarely before the people in the reports of school surveys.

No one can read this vigorous challenge of the six-six plan without realizing that if the plan is to gain a wider adoption it must prove itself to be more democratic than the present plan, it must prove itself to be supported by the maturer experience of older civilizations, it must prove itself to be in accord with "psychological needs," and finally it must incidentally provide an answer for each and all of Professor Bagley's questions and criticisms.

Let us begin with Europe, since that is the easiest matter to set at rights. It is true, as Professor Bagley points out, that each of the European systems is a twofold system. The *Volkschule* of Germany educates its pupils for eight years and then turns them into the laboring and common soldier class. The secondary schools alone provide the student with the expectation of going on to a higher education. It should be noted, however, that for every student who has the expectation of a complete education the system is very much like that proposed in the six-three-three plan. If a boy is going to have a complete education, his training is not divided into an eight-year period and a four-year period, but his training is divided into a three-year primary, a six-year period which leads to military privilege, and a three-year period for completing his secondary course. And the six-year period above men-

tioned is so subdivided in the content of its courses as to make it perfectly clear that the age of twelve years is recognized as a most important turning-point in his training. For the child who is to have a complete training in the German system the division of work is like that proposed in the six-and-six plan in that the age of twelve is recognized as a point of readjustment. We can agree with Professor Bagley's repudiation of the dual, undemocratic system of Germany, but when we have done so let us not accept the eight-year school as our model, for that is what Germany provides for those who are to have only limited opportunities.

The case is no less clear in England and France. Let us take England, which provides a somewhat simpler demonstration. In England one finds that there is a method of transition through examinations from the common school to the secondary school. The secondary school of England, like that of Germany, accepts boys from the better classes at the kindergarten age. The secondary school, in contrast with our American secondary school, has primary grades. Also, as indicated above, this school receives in the upper classes after examination the products of the common schools. These transfers are usually made before the age of fourteen. Indeed the effort is everywhere made to push the transfer age back to at least twelve. The writer had the experience repeatedly in visiting English secondary schools of hearing the headmasters complain that the late transfers from the common schools were most disadvantageous. The boys who grow up in the secondary schools begin their languages and their science and their mathematics at twelve. The boys who come in late from the common schools are at a great disadvantage. The headmasters clamor for an early transfer, if the transfer is to be made at all. They want their students not later than twelve years of age.

It is hard to understand how Professor Bagley can be so offended by the citation of the example of Europe in favor of the six-and-six plan. Indeed, if he will go to Scotland, where they have long prided themselves on their skill as schoolmasters, he will find a six-and-three plan and a six-and-six plan working out in detail some of the problems which his editorial suggests. It is strictly true that Europe is the best possible source of examples of a successful

six-and-six plan. At the same time it is strictly true, as Professor Bagley points out, that the six-and-six plan as administered in Germany is not the plan of the common school. This last statement furnishes us with the text with which to open up the matter of democracy in our schools.

The eight-and-four plan of American schools was not the product of a struggle for democracy. Everyone who belongs to the generation of present-day adults knows that in 1880 the high school was not a democratic institution. If one goes back to 1870 or 1860, the case is even clearer. The American high school was at its inception the home of the professional class. The very fact that Professor Bagley and most of the rest of us use the phrase "common school" as synonymous with "elementary school" shows that the high school still retains something of its traditions of exclusiveness. Since 1880, however, one of the most impressive educational changes that has ever gone on in any land has been going on in the high schools of the United States. The student body has doubled twice. Schools of this grade are built with a lavish equipment that bears eloquent testimony to the fact that communities are prepared to give children the best there is, even if they have to bond the future so that the children will have to pay for what they get. States have vied with each other in paying traveling expenses of boys and girls in rural sections, so that it may be truthfully said that to the great majority of American children is offered the opportunity of a secondary school education.

These facts may all be summed up in a single statement: The high school has come to be a part of the common-school system. With this change come the opportunity and the duty of setting aside every artificial barrier to the best organization of the complete course of study. The eight-and-four system is an inheritance of the days when the common school and the high school were separate in organization and purpose. The eight-and-four plan is a painful reminder of the fact that the common school of America was modeled on the limited, undemocratic people's school of Europe. Now we may face our new problem of a single complete school system without restraint of any type. Let us divide only where changing development in the child's mind calls for change in

method. Let us take advantage of continuity of purpose and aim in the only land where continuity is the hope and the right of all classes.

We do not need to go to Europe, however, for our evidence that the eight-and-four plan is not a fixed and finally approved plan. New England, representing as it does our oldest and on the whole most favored section, tried an experiment of organizing nine years of elementary or common schools. This experiment preceded the present period of high-school training and represents one method of extending in a democratic way the school opportunity of the common people. That experiment failed because it offered too meager an enlargement of the school opportunity. Though one finds throughout New England today many ninth grades, they are recognized as appendenda inherited from an experimental past. Who would think of advocating a ninth grade today as the solution of our American problem of democracy?

On the other hand, we have seven-year common schools in abundance. In a careful study reported in the *Elementary School Teacher* in 1913,[1] Mr. E. C. Brooks, professor of education at Trinity College, Durham, North Carolina, justifies the following statement:

> The information obtained shows that the seven-year grammar school is found in nearly every state in the union; but as a rule it prevails more generally in the South. In New England the nine- and eight-year schools are found in about equal ratio in the larger cities, but the tendency is to reduce all to eight years; while in the West the eight-year school prevails with a tendency to reduce it to seven.

Professor Brooks then compares the programs and modes of promotion common in these different schools with the view to answering the question which he is continually raising, namely: "Can a four-year high-school course resting on a seven-year grammar school give a preparation equal to that of a four-year high-school course resting on an eight-year grammar school?"

The conclusion which he reaches in this matter is not very definite. Two quotations from the later pages of his article will make this clear.

[1] Vol. XIV, No. 1, pp. 20–28; No. 2, pp. 82–92.

All the evils and defects of all of the schools can be found in either class—those of a seven-, eight-, or a nine-year grammar school. . . . . Therefore, I am leaving the question where I asked it. The answer is an individual one, not general. It may be wrong, it may be right, and there are instances enough to prove either. Let me say here that we find in every section of the country schools that seem to be working away and trying to understand the reason for the large or the small number of subjects; and the tendency seems to be toward the smaller number.

In the light of these facts how can anyone find any inalienable bond of connection between democracy and the eight-four plan?

If now one turns to the eight-four plan itself, he finds evidence enough that it is weak educationally at many points.

First, let it be noted that in most progressive schools the seventh and eighth grades are organized on the departmental plan with the clearest possible recognition in this fact that the children in these grades require a type of treatment which is wholly different from that given in the lower grades. Children in those upper grades are able to assume responsibility. Their interests begin to be differentiated; their personalities become pronounced; thought and behavior become independent.

Second, where school systems have not been wise enough to put new and advanced work into the upper grades, these grades become the homes of the most vapid, wearisome, and futile reviewing. Arithmetic has been incumbered with clumsy and useless formulas in the effort to stretch it to the point where high-school algebra begins. Can anyone find a valid reason why algebraic methods should not be put at the service of "common-"school children? Can anyone tell us why studies of space should be classified as the property of the higher schools? If the lines of demarcation which are now drawn have justification other than tradition, certainly the defender of present practices ought to be concrete and explicit in defending the present course of study.

From the point of view of the high school the demand for readjustment is no less urgent. One of the cardinal principles which has always governed the high-school course of study is the principle that the student must be introduced to all the broad fundamental types of human knowledge. The student must be introduced to natural science, to the study of social life as this is set forth

in history and civics, to other civilizations and their languages and literature, to mathematics in the form of algebra and geometry, to the vernacular both in its literature and in the rhetorical principles that govern its effective use, and, last but not least, to applied knowledge in commercial subjects, and in the practical arts of industry and domestic organization. With this elaborate program before it the high school has been seeking by every possible device to find the time to do its work. It has gradually pushed up the quantity of its requirements until now a bewildering mass of materials is being offered to young people every year and yet the range of high-school offerings is constantly increasing. How shall this congestion be cured? There is but one answer: Give the high school more time in which to do its work. Some of this additional time must ultimately come from a more intimate correlation of high-school work with college work, but some of it must certainly come from a reorganization of the relation of the elementary school to the high school.

If readjustment is thus demanded both by elementary programs and by high-school programs, it is sufficiently justified. But there is another argument in which the interests of both elementary schools and high schools are represented. At present there is endless duplication. English is the worst sinner in this respect. Two years ago the writer heard a committee solemnly report to the National Council of Teachers of English that the problem of correlating elementary English with high-school English is a new and unsolved problem. Unsolved it is, and unsolved it will continue to be so long as seventh- and eighth-grade teachers find their pupils able to do work of the same type as high-school students while the teachers who give this work are not invited into high-school conferences. So long as the upper grades and the high school are apart, Julius Caesar, Miles Standish, and the Ancient Mariner will be used by both sets of pedagogues, and children will wonder why teachers do not find out about each other's work.

History is not quite so bad as English, but it is bad enough in its duplications and conflicts. Of late, nature-study in the grades has sometimes tried to do general introductory work; sometimes the high school has repeated all this work. Science is in a chaotic

condition, in part because the high school and the upper grades belong together but have never succeeded in getting together.

There is one and only one solution of this problem—that is, a reorganization of the schools in the spirit of a more complete recognition of the fact that the seventh and eighth grades are a part of the adolescent school.

The study of children not only warns us of the necessity of preparing for the adolescent changes, but a fuller study of the period just preceding twelve years of age teaches us that this age closes a natural division of school life. It is hardly appropriate in a brief paper like the present to attempt a detailed analysis of the child's mental and social development. It is, however, appropriate to our general theme to point out that during the first three years of school life children are utterly dependent on the examples of society. This is the period of absorbing interest in people and their doings. This is the period of docile imitation. This is the period of initiation into the social arts. At nine years of age or thereabouts comes an entirely new attitude. The child now breaks away from society and enters upon a period of interest in things. During this period the child cultivates a new realization of his own personality. The boy is likely to be rebellious against the restraints of school. This attitude of recoil from the docility exhibited in the primary school is essentially a preparation for the later return to social interests which is characteristic of adolescence. The intermediate period of interest in things and of rebellion against society is a natural antecedent to the adolescent period. When our educational studies are completed we shall not only recognize the striking characteristics of adolescence; we shall also realize that the whole school life must be controlled in its organization by the periodicity of the child's development.

To discuss in a broad, general way the needs of democratic society does not help us very much in organizing the details of the course of study. There is a possibility of organizing the high school so that it shall be democratic; there is a possibility of organizing the elementary school in such a way that it shall serve very little the ends of democracy. Professor Bagley, who furnished us our text for this discussion, can rest assured that we all agree with his

demand for democracy. We cannot share his fear of the high school. His case will not be complete until he shows that the high school is inherently undemocratic. That thesis is likely to prove difficult to defend—more difficult even than his assertion that Europe furnishes no examples of the six-and-six plan.

It is not well, however, to leave the discussion at a point where it seems to be a discussion of remote possibilities. The six-six plan is here for better or for worse. It has come as a result of a natural evolution. It is adopted by many schools which find the eight-four plan unworkable. The advocates of reorganization have a much more optimistic problem than that of beating off skeptics. Our real problem is to make good on the new plan. There is one real danger that threatens the plan. Too often the school system which adopts the new plan does not make a sufficiently radical reorganization. The first years of the junior high school perpetuate the unprogressive, uneconomical traditions of the seventh and eighth grades. Where the six-six plan means nothing but the transfer of two grades from one jurisdiction to the other, it is not worth adopting. The six-six plan, if it is to justify itself, must effect some real economies. There must be broader opportunities offered to students. There must be elimination of duplications. All that is summed up in the statement that students must be carried farther along in their social and intellectual lives under the six-six plan than under the eight-four plan. Critics of the six-six plan will then be adequately answered. What is needed is not opposition to the new plan, but a clear description of the indispensable virtues of the present grades. The task of those who are disposed to be critics comes to be, therefore, the task of praising as loudly as they can in explicit detail that which they admire most in the present elementary school. When they can speak with sufficient eloquence to persuade the world, they will have done the six-six plan the highest service, for they will have taught the six-six plan what to retain. On the other hand, the six-six plan is free to go on its way adjusting its relations to the schools above and below and adjusting its internal relations with a freedom that is new and altogether wholesome, for this new freedom grows out of a social situation that is evidently to be permanent and out of a scientific study which promises to become widespread.

EFFICIENCY FOR EFFICIENCY'S SAKE[1]

FRED NEWTON SCOTT
University of Michigan

There is something very alluring to certain classes of minds—including my own—in the phrase "an exact science." It seems to have about it a superior virtue, a halo, an odor of sanctity which puts the poor shambling inexact sciences to shame. Consequently we hear a great deal nowadays about the making of this, that, or the other subject of study into an exact science. In every field of knowledge—in economics, in psychology, in linguistics, in sociology, in ethics, in short in all of the looser-woven "ics" and "ologies"—somebody is setting the screws a little harder. In every one of these departments of instruction some stern, wall-eyed thinker, rising stiffly and frowning upon his shamefaced colleagues, has announced that in *his* book or brochure or syllabus the subject has at last been elevated to the status of mathematics, physics, chemistry, and astronomy. Nay, even in such irresponsible, Ariel-like subjects as literature, music, and the arts generally, the same motive is seen at work. Within the past few years a book by the brother of an eminent scientist, himself a scientist of some note, professes to have raised to the dignity of an exact science the whole subject of poetry.

In a movement of so sweeping a character it was inevitable that education should sooner or later come in for its share of attention. That time seems now to have arrived. Indeed, if one may judge from the number of books and articles on the subject that have appeared within the past three years, we are now on the crest of the wave. The special form which the rage for exactness has taken in the field of education is, I need hardly say, the same as in the field of industry, namely, the testing and measurement of efficiency. By prolonged observation of classroom procedure, by the application

[1] Presidential address given before the North Central Association of Colleges and Secondary Schools, Chicago, March 20, 1914.

to pupils of ingenious tests, by minute analysis of data, it is sought to determine with mathematical precision the net effectiveness of the teaching process. The results, when they are arrived at, are expressed in the form of scales, diagrams, curves, and tables of percentages.

As a rough indication of the growth of interest in this subject of educational efficiency one may cite the articles listed under this head in the *Reader's Guide to Periodical Literature*. In the years from 1905 to 1910 but two articles appeared; in 1911 seven articles; in 1912 seven articles; in 1913 twenty articles. A selection from some of the more recent entries will show the direction and progress of the movement. Thus: "Measuring Educational Processes through Educational Results"; "Tests of School Efficiency"; "Means of Measuring Educational Products"; "By What Standards or Tests Shall the Efficiency of a School or System of Schools Be Measured?"; "Is Scientific Accuracy Possible in the Measurement of the Efficiency of Instruction?"; "Need of Standards for Measuring Progress and Results"; "Reliability of Single Measurements with Standard Tests"; "Testing of Children for Mental Efficiency." Perhaps nothing, however, will convey a better idea of the seriousness with which the idea is accepted and the lengths to which it is proposed to carry its application than a recent address by President Lowell, of Harvard University, before the New England Association of Colleges and Preparatory Schools. The address was entitled "Measurements of Efficiency in College." Says President Lowell:

> I take it that the development of intellectual capacity by training of the mind is a part—if you will, the highest part—of biological science, and as such it is subject to the biological laws of variation. In his inquiry into human faculty, Galton studied the variation in the marks of the wranglers at Cambridge University, and found that they all conformed to his general law of the probable curve.
>
> If the biological principles apply to education, the biological laws of variation ought to be true, and hence, in any large bodies of pupils, the curve of probability ought to be significant. If in two large courses the marking varies greatly, there must be some reason for it, and the most common reason is that one is easier than the other, or the standard of marking is more lenient. . . . . The curve of probability is not an absolute measure, but it is an indication. It ought to put one on one's guard. It is a danger signal; as the lawyers say, it gives notice.

To those who are interested in measurements of efficiency it is a source of great gratification that the Department of Economics at Harvard has requested the Department of Education to investigate the efficiency of its teaching. As yet, it is too early to speak of the methods that are being employed . . . . but it is fair to say that they promise much. At present, it is enough that by cordial co-operation a step has been taken which bids fair to bring education nearer to the goal of an exact science.

A movement which has gathered as much headway as these facts indicate is likely to go much farther. The passion for testing efficiency will not slack until every element and factor of the teaching process has been submitted to rigorous quantitative measurements. Still further, the results of these measurements when they have been ascertained are certain to be used in determining the value of the teacher's work and ultimately in defining his function and fashioning his ideals. That the results of all this inquiry, as of scientific investigation in general, will in the long run be beneficial, I have little doubt; but the run may be very long, and in the meantime, especially while enthusiasm for the new method is high, there is a serious danger against which teachers need to be on their guard. It is the danger that under the stimulus of this fascinating idea the investigator, in his rage for measuring everything in sight, may overlook, and induce the teacher to overlook, the true end and nature of education. It is not inconceivable that the teacher, dazed by the brilliancy of the new conception, may be brought to think of himself only as a factor in the production of curves of efficiency and of his pupils only as rated units in the determination of percentages of distribution. In other words, there is a real danger that efficiency, having become a fetish, may be pursued purely for efficiency's sake.

Should this unfortunate state of things come about—and I am bound to say that the signs of its approach are to my mind unmistakable—the peril would, as usually in educational matters, be of a twofold nature: first, as it would affect the individual teacher, and second, as it would affect the status of the profession of which he is a constituent part. I will speak briefly of each of these aspects.

As regards the teacher, the danger is that he may be judged, and may be led to judge himself, by a false or inadequate standard.

Scientific measurements are of a quantitative kind. In the nature of things they cannot be otherwise. The standards of measurement are consequently also quantitative. The results of the applications of these standards are quantitative and can be expressed in mathematical or other abstract symbols. But the most efficient things in teaching are not, in my opinion, susceptible of adequate quantitative measurement. They are such things as personality, sympathy, sincerity, enthusiasm, intuition of character, taste, judgment, love of truth, tact. These things are qualities, not quantities, and any judgment of them, to be adequate, must be made in terms of quality. To be sure, in the case of any quality, we can indicate the more or less of it in mathematical symbols, but how thin and ghostlike are such records compared with the living reality. Consider, for example, teachers' recommendations. It is one thing to look over the markings of an applicant for a position as teacher; it is a startlingly different thing to be confronted by the person himself. Everyone who is called upon frequently to recommend candidates for positions must have received letters like the following: "I am satisfied with the candidate's record, but please tell me confidentially and in a word whether he is the man I want." And no curve or formula will serve as the answer to that agonized appeal.

Though the scientific investigator is careful to assert that he does not pretend to measure quality, yet by his preoccupation with quantitative matters, by the emphasis he throws upon mathematical ratings, he gives the impression that the quantitative aspect is not only all-important but all-sufficient.

There is a delightful story about the children of Darwin going to visit a neighbor's child at a time when Darwin was wholly absorbed in the study of barnacles. The Darwin children explored the neighbor's house with great curiosity, going upstairs and down, inspecting the stables, tool shed, and pigeon house with growing bewilderment. When everything had been seen, the Darwin children could repress themselves no longer. One of them turned to the neighbor's child and asked, "Where in the world then does your father do his barnacles?" I fancy the time is not far off when the older generation of teachers will hear from the devotees of efficiency

a similar question, "Where in the world then do you do your curves?"

Nor is President Lowell's reference to the curve of probability a mere *brutum fulmen*. In a number of universities, so I have been told, it is the custom to plot once or twice a year the curve of every teacher's markings in examinations, and in case any curve varies from the so-called normal curve, as determined by the researches of Galton and Karl Pearson, to send it with a note of warning to the instructor concerned.

Lest I may seem to have exaggerated out of all reason the influence of the efficiency curve upon the minds of college teachers, I will give two instances which I can personally vouch for. In one case an instructor deliberately added the name of a fairly good student to the list of failures just in order to bring up what I am tempted to call his batting average, that is, to fill out the normal 10 per cent of failures. In the other case an instructor announced at the beginning of the semester that owing to the presence of several mature professional students who had already been over the subject, the grades of all the rest would be materially reduced.

But, as I have said, the peril involves not only the individual teacher but the status of the whole teaching profession. The tendency of much of the present-day testing for efficiency seems to me to be steadily in a downward direction. If it goes on to its natural terminus it will inevitably shift the status of the teacher's life-work from that of a liberal or learned profession to that of a business or even a trade.

We speak of professions as learned, but the difference between a profession and a trade lies after all not so much in the relative degree of learning required in the two cases as in the spirit in which the career is followed. A very learned man may make a trade of law or medicine or even of the ministry, if he pursues it by routine or for the money there is in it. On the other hand, men of small intellectual endowment and little schooling may by their devotion to ideal ends elevate a so-called trade to the dignity of a profession. If education is a liberal profession, it is so because those who practice it are raised above the common level by ideals of service and love of humanity and by an unquenchable desire to pass on to

others the knowledge that they have found so precious and so comforting.

I do not know how the profession of teaching presents itself to those who are before me, but to me it has always seemed very closely akin to the ministry. Between teaching and preaching there is an affinity which rests on no merely superficial resemblance. I have always thought of the teacher as being called to his pursuit by inward promptings, not by caprice or merely material considerations. I have thought of him as entering upon his work with a broken and a contrite heart, searching the inmost folds of character and conscience to see if he were worthy of the responsibility and equal to the task. I have thought of him as pursuing his work with the devotion and the fervor of one who has consecrated himself to a high calling. Still further, if the work of the teacher is to be tested for its efficiency, I have thought of this test as being the same as that of the ministry: Is he a saver of souls? Is he a fountain of light and hope and courage? Does the spark of intelligence in the young minds before him as he addresses them shoot up into sudden flame? Do those who have sat under his ministration look back to their contacts with him with gratitude as occasions when the finest and best in them was aroused and stirred to activity? Has he been able to inspire them with the love of truth, with the ambition of being wise and good, with the growing power to enjoy what is pure and noble and finely wrought?

I have been told that it was once the custom at Oberlin College—it may be yet for all I know—for the instructors to open every recitation with prayer. For my part I could not do that. Wild horses could not drag me to a recitation room for such a purpose. The act of prayer thus made compulsory would, I am sure, in my case quickly degenerate into ritual, into formula, into hocus-pocus. Nevertheless there is something about the idea that appeals to me strongly. I believe in the spirit of the practice. I believe, that is, that the schoolroom ought to be a kind of shrine. It was so to me when I was a child. It was, in the religious sense of the word, an awful place, and none of the trivial happenings of the daily routine could rob it of its significance. So it should be for the teacher—a holy place of which he is the high priest. The teacher who, when

he enters his classroom, does not feel at least momentarily something of the devotion of the minister of God, who does not then and at intervals thereafter, as he conducts his work, feel within him some stirrings of the divine spirit, is not a teacher. He is a curve. He should go into some pursuit where curves are true expressions of efficiency.

To carry out the suggested analogy and press my point home, let us imagine the pastor of a church summoned before his vestry on charges of inefficiency. The following dialogue might ensue:

Chairman: The members of the vestry have been looking over your annual report, Mr. Primrose, and, to speak frankly, they are not entirely satisfied with the results.

Pastor: I have done my best, gentlemen.

Chairman: No doubt, no doubt. We give you full credit, say 2½ per cent, for your good intentions. But you must remember we are now living, not in the days of the early Christians, but in the twentieth century. This is an age when these mere subjective measurements are discredited. There must be no fumbling, no guesswork. Our official inspector has plotted your curve of efficiency and I am bound to say that it departs seriously from the norm, that it is, in technical language, badly skewed. It is true the number of church-members has increased in about the right proportion. The percentage of backsliders, though possibly below the normal, is not disturbing. But these are negligible. Let us come now to the important things. How many souls have been saved during the year?

Pastor: My report says two hundred and fifty.

Chairman: Two hundred and fifty, 25 per cent of the entire church membership! Oh, my dear sir! This will never do! Karl Pearson allows but 10 per cent. Are you aware, sir, that a comparative statement shows that you are saving more souls than any other clergyman in the city?

Pastor: I had thought of the saving of souls as my life-work. It is my hope, my comfort, my inspiration.

Chairman: Yes, yes. We have heard all that before, and I am sure it does you credit. But 25 per cent! Impossible! Contrary to all scientific principles. You must understand once for all that this church is run for efficiency. The saving of souls is a secondary consideration. Now let us look at the other end of the curve. How many do you suppose that you have sent to—well, not to mince matters—have sent to hell?

Pastor: As few as possible.

Chairman: So I should judge. One-half of one per cent. Really, this is shocking. My dear Mr. Primrose, if this church is to maintain its standards of efficiency, 10 per cent—at least 10 per cent—must be consigned every year to eternal damnation.

Now I do not mean by this bit of dialogue to imply that teachers shall make their courses easier, or adopt a different marking system, or let pupils pass when they should not pass, or anything of the kind. My sole point is that to lead teachers and administrative officers to believe that arithmetical data or quantitative measurement of any kind can serve as a test of the teacher's efficiency as a teacher will ultimately result in degrading the profession.

As an example of the misleading sort of testing and its influence on the profession of teaching, I can cite nothing more apt than Mr. Cooke's elaborate *Report on Academic and Industrial Efficiency* prepared for the Carnegie Foundation and published as one of their bulletin numbers. Interesting as this report is and valuable from the purely scientific point of view, I do not hesitate to say that it is for the teaching profession a mischievous document. I do not see how any young teacher with his ideals and standards yet to form can read it without danger of infinite harm, nor how any old teacher can read it without a sense of shame and degradation. I have thought sometimes that the only rational way in which to regard it was as a huge joke—a sort of Gulliverian travesty of the whole efficiency idea.

Whatever may be said for and against it, the testing industry in education is likely to go on with unabated vigor. Like it or not, we must put up with it and turn it to the best uses we can. Since that is so, I would make a suggestion. It is that if such tests of efficiency are good for pupils and teachers, they are equally good for their superior officers. Why withhold this precious boon from principals, from superintendents, from college presidents? It would be most interesting, for example, to inspect the curves of superintendents of city schools as plotted by the members of the school board. Or, to take a pertinent instance from recent history, why should not a certain trustee of a certain state university, which shall be nameless, lay upon the desk of the president a carefully plotted curve of the president's successes and failures for the past year from the viewpoint of the trustee? We can all imagine, I think, the expression which would flit over the president's face as he examined his curve. That expression would be worth preserving photographically. I suspect that it would not be the expression

of a broken and a contrite spirit, but rather, in the words of the psalter, the expression of a stony heart that is insensible of the burden of sin, stubborn, rebellious, impenitent, and incorrigible.

But we must not stop here. We must go on to test school boards and boards of trustees, bodies which present curious variations of efficiency. We must test the people who elect these boards, and, ultimately, we must test the testers themselves, who are not free, I suspect, from the defects of our common mortality. And thus that happy time will arrive when, everybody being engaged in testing everybody else, we shall be like those fortunate inhabitants of the Scilly islands who are said to make a comfortable living merely by taking in one another's washing.

In concluding let me guard against a misapprehension. It may seem to some that what I have said has shown a hostility to the whole efficiency movement. I should be sorry to give that impression, for I have a great deal of sympathy with the movement and always read with interest whatever bears upon it. As applied to industrial organizations, to administrative work, to material productions, to anything in short which can be adequately represented in quantitative terms, whether in education or out of it, the precise measurement of efficiency is one of the great inventions of our age. It is only where spiritual factors and ideal values are involved that I have my doubts. In this region precise measurements are difficult and quantitative standards a delusion and sometimes an impertinence.

For my part, if I wished to correct the aberration of a young instructor, I should not send him a curve of probability. I should rather send him, as at once a corrective and a stimulus, Plato's beautiful vision of the ideal education:

> Then will our youth dwell in a land of health, amid fair sights and sounds, and receive the good in everything; and beauty, the effluence of fair works, shall flow into the eye and ear like a health-giving breeze from a purer region and insensibly draw the soul from earliest years into likeness and sympathy with the beauty of reason.

EDUCATIONAL NEWS AND EDITORIAL COMMENT

General Science or Special Science?

Substituting the Encyclopedic for the Educative?

[The Editors invite contributions on the important issues here stated]

The *School Review* considers itself fortunate in placing before its readers two radically differing views concerning the teaching of the first year, possibly the first two years, of general science in the secondary schools. Articles in this number by Professor John M. Coulter and Professor Fred D. Barber argue, negatively and affirmatively, upon the question: "Is there a place in the high-school curriculum for courses in 'general science' as contrasted with 'special sciences'?" (see pp. 1 and 9).

Upon two important points the writers agree. The first may be stated in the words of Mr. Coulter: "It is men and women we have in mind, not science, nor the various subjects under which it is organized." This vigorous statement may be accepted as the basic principle of all curriculum-making. The second point of agreement is that general science textbooks and courses of study have been unsatisfactory, at least up to this time. Mr. Barber characterizes as a "hodgepodge" and a "spineless wonder" a course which puts together small sections of special sciences and calls them "general science." Mr. Coulter agrees, calling such a course "an inextricable tangle," "a mosaic made up of fragments of information."

Here the two writers part company; one asserting that general science cannot be organized nor its teachers properly prepared to enable it to deserve a place in the secondary schools. This argument holds that the fundamental principles of any science are so deeply laid and can be approached only by such painstaking endeavor that a smattering of several sciences runs the risk of missing those fundamental principles entirely. The other writer strongly advocates that the new course, as yet but a few years old, can be properly organized and efficiently taught and ought to become the method of introducing the large mass of high-school students to science. Many of these will not become research workers, and it is thought that general science is the best introduction for all.

The primary pedagogical issue, upon which the settlement of the controversy must rest, is set forth by implication in the main thesis of

Mr. Coulter. He maintains that the chief contribution of science-study to education, to be secured by actual contact with the materials of science, is a mental attitude which he calls "self-elimination." The complementary attitude, self-injection, is to be contributed by the humanities, as in literature. Self-injection is the very essence of appreciation. Science, on the contrary, must insist upon "rigid self-elimination in the discovery of absolute truth." For the reasons that persistent self-injection tends to mysticism, a confusion of ideals (or even vagaries) with realities—a proficient cause of all irrational beliefs—and that "persistent self-elimination clips the wings that would carry us now and then beyond the treadmill of life into the free air," Mr. Coulter insists that any scheme of education which does not provide a definite cultivation of both attitudes is in constant danger of resulting in mental distortion. The implication is, of course, that special science will develop the latter attitude unduly, and that general science will not develop it at all.

This thesis raises the issue: Can courses in general science be so organized and so conducted by teachers sufficiently equipped in all fields of science as to develop through contact with the materials of science the mental attitude of self-elimination in the discovery of absolute truth?

It is only fair to state that Mr. Barber, in presenting the argument for general science, did not have this issue squarely before him. Hence he does not meet it directly. Indeed, the whole preliminary contention for this program seems to indicate that the reasons for the advocacy of general science push self-injection, the very opposite of self-elimination, to the fore. "The needs of the masses of young people . . . . preparing for the ordinary activities of life" must receive consideration; "science . . . . must take root in the daily life activities"; the masses must be taught "to think scientifically as they work"; "these people have little need of special training and technique." All of these contentions indicate that general science is to include the "science of common things" and that high-school students in courses of general science are to approach their study from the what-is-this-to-me point of view. Self is to be injected. Science study is to be like the study of humanities. The attitude of self-elimination in the search for absolute truth seems to be in danger of being lost.

Is this, or is it not, necessarily true?

Agreeing that courses and textbooks in general science which consist of "clippings from the special sciences" are undesirable, Mr. Barber

meets the issue indirectly by saying that new courses in general science, with units of instruction as well organized and as definite as the units of special science, can be developed. He asserts that these units of instruction will be "units of practical or applied science instead of units of theoretical science," and that "the core of the units in general science will be some process or device utilized by the individual or by society in the ordinary activities of modern life."

Let us restate the issue in the terms of Mr. Coulter's thesis and of Mr. Barber's illustration on p. 15. Can the mental attitude of self-elimination in the discovery of absolute truth be secured through direct and vital contact with the concrete materials of science, in a course which shall substitute in its organization the units of common phenomena in science for the units of theoretical science? To be more concrete: in a general science course in physics under "Light," with such common phenomena units as Primitive Lamps, Candles, Discovery of Petroleum, How Kerosene Burns, Evaporation, Boiling-Point, Petroleum, Gasoline, Oils, Illuminating Gas, Distillation of Coal, Direct and Diffused Light, etc.—in such a course can there be secured under competent instruction the real scientific attitude of mind, self-elimination in the discovery of truth through direct contact with the materials of science? Do these materials, suggested by these units which are closely related to practical science, introduce the students to arts rather than to science?

Or put it in this way: Will the masses of secondary-school pupils lose this attitude if they are introduced to science by means of this new course with units of practical and commonly significant science instead of by the old, highly differentiated courses in physics with the following typical units of theoretical science: Light, Its Rectilinear Propagation, Shadows, Refraction, Reflection, Color and Spectra, Polarization, etc.?

Upon the issue thus squarely raised the *School Review* invites discussion. Can a course in general science yield "an education *in* science *by* science"?

Department of Superintendence

The most important educational gathering of the year is the meeting of the Department of Superintendence of the National Education Association. This department, together with the several other societies mentioned below, will hold its annual meeting in Cincinnati, Ohio, February 22–27, 1915. The officers of the Association are: President, Henry Snyder, Superintendent of Schools, Jersey City, New Jersey; First Vice-President, Paul W. Horn, Superintendent of Schools, Houston, Texas;

Second Vice-President, E. C. Warriner, Superintendent of Schools, Saginaw, Michigan; Secretary, Mrs. Ellor C. Ripley, Assistant Superintendent of Schools, Boston, Massachusetts.

Societies holding meetings at the same time and place are the following: National Society for the Study of Education; Society of College Teachers of Education; National Committee on Agricultural Education; Educational Press Association of America; National Council of Teachers of English; Conferences of State Superintendents of Education and of Teachers of Education in State Universities with Commissioner Claxton; Conference of Teachers in City Training Schools; American School Peace League; International Kindergarten Union; National Congress of Mothers and Parent-Teacher Associations; School Garden Association of America; National Association of Collegiate Registrars; National Council of Education and the Departments of Normal Schools; School Administration of the National Education Association.

Drama in the High School: A Neglected Opportunity

The study of the arts in secondary schools is now standardized. Drawing and music were long ago introduced; the appreciation of poetry and of literature in general has amassed a whole library to its discussion. In composition courses we strive to get the student to write; decently at any rate; artistically if possible. The study of Nature, a thing distinct from the scientific study of Nature, is well established. Handwork and piano-playing alike will win the pupil more or less credit. But in all this recrudescence of art, what has become of the stage?

A certain superintendent, when an infrequent grand opera company reaches his town, tucks a Victrola under his arm and preaches grand opera in every school building; yet this same superintendent is singularly silent regarding the production of plays in his own theater, despite the fact that they come oftener and many, many more people attend. Except occasionally to admonish the pupils not to go, he does nothing to acquaint them with the purposes of modern drama.

This is logic badly askew, but a condition that is generally true. That there is no special prejudice against drama is evinced by the fact that high-school classes spend whole terms studying a single play. It is true this play was written some hundreds of years ago and may be considered non-infectious; but it is occasionally produced, even now, and one argument for studying it is that it may improve the scholar's taste in drama. The superintendent would not expect the study of an obsolete technique

in physics to improve his student's judgment on the X-ray, but the argument is still maintained with regard to drama. The worth of the argument may be gained from its results: the class in *Macbeth* is not infrequently found occupying prominent seats in the local vaudeville house.

If we study modern music, modern painting, modern novels, modern dressmaking, why not modern drama? If the student can gain credit for reading a novel by Galsworthy, why cannot he gain credit for studying a play by Galsworthy? This play should not be studied as literature, for drama is *not* literature; but it ought to be carefully and seriously studied as a *play*, as the most influential of modern art forms. The ethical problems of Shaw, of Maeterlinck, of Pinero, of Mackaye, of Sheldon are no more difficult than the ethical problems of *Macbeth* or *Hamlet;* indeed, judgment should be easier, since these writers deal with conditions familiar even to high-school students. If a debating society is encouraged to discuss abstruse sociological questions, is not the time come to recognize the stage as one of the most effective instruments in the discussion of sociology? Think of the aid in the fight for better plays if high-school students were given some thoughtful introduction to the purposes and limitations of modern drama, some glimpse of what the playwright is driving at, some sense of what is good on the stage and what is bad.

Why not, in a sense, legalize the high-school dramatic club, and since the high school is becoming more and more responsive to society, permit some insight into the problems of the theater? A course in modern drama would combine aesthetic criticism, ethical problems, and sociological questions, a list more formidable in sound than fact, and much needed in education. Such a course would be good for the students, good for the stage, and—perhaps—good for society.

H. M. J.

A Small School Board in New York

With his customary vigor Mayor Mitchel has pushed toward realization the movement which will reduce the Board of Education from forty-six members to nine or seven. The impetus comes from a letter written by the mayor to the chairman of the Board of Education Committee on Charter Revision. In this letter a small board with a business department is recommended. Mr. Mitchel does not indicate the number of the Board nor suggest whether the new positions should carry salaries. He is content with bringing the general principle into consideration, necessarily leaving details for the mature consideration of deliberative bodies.

The action of the mayor is doubtless based upon a report recently submitted by the Special Committee of the Board of Education under the chairmanship of Abram Flexner. The committee points out that several former recommendations to the same effect have been smothered by being referred to other committees of the Board and expresses the hope that the city administration and the state legislature will act. Mr. Mitchel has acted without waiting for the Board of Education to pass upon the report of its own committee. He evidently does not intend to have the proposal shelved in the capacious cupboards of a Board of forty-six members, many of whom may be presumed to have a strong attachment to their present positions and the prestige that goes with them.

Mr. Flexner's committee advances the usual irrefutable arguments for a small board. A large board is unwieldy. It accomplishes its results only by centering powers in the hands of a few. That all the members may have a place on a committee, useless committees are created. Various functions are too widely parceled out for effective co-operation. A small board is more deliberative in character. All important propositions can come before the entire board if it is small, as they could not with a large board. The small board, whose members are replaced gradually, not more than two a year, each member to serve four years on a board of seven and five years on a board of nine, will give less consideration to the demands of special wards and local needs. It will consider the needs of the city as a whole.

According to Mayor Mitchel a small board involves the creation of a business department to take over many of the functions now exercised by the committees of the general board. At present there are fifteen standing committees, all of which exercise executive functions. The inevitable result was well put by President Eliot in an address a few months since. The ridiculousness of the spectacle of a board of education concerning itself with details like the following is tempered only by the sobering reflection of the harm done by the attempt to pass on all executive and administrative details in general meeting. These are a few typical items of business transacted which he enumerates:

> The discontinuance of Public School 70, Queens, and the transfer of eight pupils to Public School 87; the nomination of five teachers of physical training for elementary schools; the transfer of a woman principal from one school to another; the nomination of two teachers for one of the training schools for teachers; the compensation of janitors in public-school buildings; the sale of products of the Parental School and the Manhattan Trade School for Girls; the establishment of the position of bricklayer at 75 cents per hour, or $6 per day;

some furniture for schools named, and an equipment of wood-working tools for a high school; appointments of some clerks, stenographers, and typewriters; the promotion of one stenographer; the dismissal of a cleaner for neglect of duty; the dismissal of a janitor; small appropriations for various constructions and repairs; the suspension of a draughtsman; the appointment of three thermostat repairers; the excusing of a school principal for absence one morning; the transfer of three janitors; the appointment of a fireman in a public school; increasing the salaries of two cleaners; the payment of a bill of costs in a proceeding for the acquisition of title for part of a proposed school site; the appointment of an auto-truck driver for the Bureau of Supplies; the lending of sixty desks and seats to Fordham University; the compensation of a machinist; the dispensing with the services of certain clerks in the Bureau of Supplies; permission to the principal of a school to hold the graduation exercises of the school in a Y.M.C.A. building. These are fair samples of the administrative details that came before the Board of Education at its meeting on January 14, 1914.

Even a casual examination of the miscellaneous items cited by Mr. Eliot indicates that they fall into two general categories. In a great system like New York it is inconceivable that a general board of any size ought to consider the appointment of janitors; this matter of business ought to be in the hands of a business manager. It is equally inconceivable that the appointment of teachers should be left to a general board of any size, or be left to a business manager. Such details should be in the hands of an educational expert. Upon the advisability of having under a small board two experts, one business, one educational, Mayor Mitchel has not yet spoken. It is however not difficult to predict where a man of his discernment will stand.

We may then confidently look for the time in the near future when the most important educational enterprise in the country, the public schools of New York, will be conducted under educational policies instigated by a Board of Education of nine members, which will delegate, as does the governing board of any large enterprise, the administrative and executive powers to experts. If by a queer and inexplicable blindness, New York's representatives should fail to see the value of the services of the present educational expert, they should do as all other boards of directors do, dispense with his services and secure a man whom they can hold responsible. Then they should remove the fetters, political and otherwise, and say to the expert in whom they have confidence, "Go ahead and give us a good administration of our schools."

President Eliot says upon the general issue involved:

No person experienced in any sort of administration—governmental, educational, or industrial—would believe that the Board of Education was

competent to deal effectively or wisely with such matters or could properly be charged with such functions. Any competent railroad, bank, or factory manager who examined the administrative structure of the New York public-school system would be sure to ask, How has it been possible to maintain under such a board with such functions even the present inadequate system? The answer to this question is that the city has had the benefit of the devoted services of a remarkable superintendent and of thousands of teachers who were faithful to their calling and their pupils, in spite of the many trials and discouragements.

The functions of the New York Board of Education should be confined to the determination of general policies, the appointment of the principal executive officers of the system on the board's own initiative, the appointment of lesser officers on the nomination of superior officers, and the maintenance through carefully selected experts of thorough inspection, supervision, accounting, and publicity. The merit system should, of course, be applied throughout the service to both appointments and promotions.

The principal executive officers to be appointed by such a board should be: (1) A superintendent for all educational matters with any needed number of assistants nominated by the superintendent in specified departments or divisions of his work; a business manager to control the expenditure for supplies, service, and maintenance of both buildings and equipment; a controller for disbursements, accounts, and summarized monthly reports; a recorder, who would keep the records of the board itself and of any subsidiary boards whose proceedings nearly concern the proper work of the principal board, and on the basis of these records give to the public from time to time those items of public-school business which the general public ought to hear about; an architect and an engineer to design new buildings and constructions, manage lighting and heating plants and playgrounds, and make recommendations concerning purchases of lands and buildings. These principal officers should be supplied with all needed assistance on a scheme adopted by the board, and the whole executive work of the school system should be in the hands of these officers and their assistants.

Vocational Novelties

The attempt to bring vocational studies into closer and closer connection with the problems of the world brings into being many schemes which may be aptly termed novelties. Some of these are of value, some are merely curious.

Principal Hughes, of Bay City, Michigan, is installing a plan of vocational guidance modeled on the Grand Rapids scheme. An article by him in the *Bay City Times* reminds us of some of the admirable particulars of that well-known system. The writer, in describing the older

plan, lays emphasis on those features which he evidently wishes to incorporate into the Bay City curriculum.

One aspect of the work which he describes is the reading of books from the seventh grade through the high school which are descriptive of vocations or stimulating to the expression of the pupil's talent. Of the seventh grade he says:

> The purpose of the work in this grade is to arouse the pupil's ambitions along vocational lines. Books such as Sarah K. Bolton's *Lives of Girls and Boys Who Have Become Famous*, Fanny E. Coe's *Heroes of Everyday Life*, and R. S. Baker's *Boys' Book of Inventions* are read either to or by the students. Short themes such as "The Kind of Home I Would Like to Have" and "The Kindest Deed I Ever Did" are written by the pupils of this grade. It will be observed that the effort is not only to arouse the child's ambition but to get him to analyze himself, and to give expression to the findings of that analysis.

Higher grades, of course, read heavier material.

Passing over the vocational study of history, in the high school, he next describes the junior board of commerce which is "affiliated with the city board of commerce, enjoying many privileges through its association with the men's organization and helping in many lines of work." He desires to have Bay City hire a vocational guide like the Grand Rapids guide, who

> conducts an employment bureau and has power to investigate all factories of the city, having just been appointed deputy factory inspector by Governor Ferris. He tries to learn all he can about the different occupations of the city, wages, moral environment, opportunity for advancement, etc. He tries by careful study of the pupils conducted by more than one person and extending over a course of years to find out what the student is fitted for. Then he attempts to fit the right person to the right place, and he does not hesitate to refuse to furnish workers for occupations which he considers undesirable.

Another attempt to link study and reality is the installation in the Great Falls, Montana, high school of an actual savings bank, run by the pupils in the commercial department. Of this the *Great Falls Tribune* gives the following account:

> A banking office has been installed in the high-school building and every detail of handling savings accounts at that place will be carried out as a part of the school savings system. This has been decided upon by the board of education and the banking office has been constructed to be a permanent feature of the work of the commercial department.
>
> After consultation with the faculty at the high school, it was agreed that the system should be instituted as a feature of the commercial course; that banking offices should be permanently constructed, and the savings bank

should be operated by the commercial department; that money might be deposited and books issued by the high-school savings bank, just as books would be issued to customers if they came to the offices of the official bank at its downtown location.

This is an extension of the idea that the students in the commercial branches might profitably learn by doing the work of the school. In many high schools the principal's stenographer is a student, and students do much of the clerical work. The heavier responsibility of running a savings bank may fairly be regarded as a little less certain of success.

The Ferris High School (Detroit) has gone into the catering business, if we are to trust the gleeful newspaper reporter. The domestic science class will prepare and serve luncheons, etc., on order. With delightful logic the article continues: "Entertaining in Highland Park is not such a difficult matter now as it is in some places." A class of twelve girls has undertaken the business, under the direction of the instructor; money earned in this way is to take the class on a vacation trip to Washington, D.C. Here again is the same desire to unite vocational study to a real problem.

The Junior-College Movement

That the junior-college movement is spreading rapidly in California is evident from a report by W. C. Woods, commissioner of secondary education in that state. The legislature provided in 1911 that the high schools of California might establish two years of lower-division university work in addition to the regular course. Mr. Woods tabulates the following statistics as the results of two years of trial:

	First Year	Second Year	Total
Fresno	40	12	52
Los Angeles	490	40	530
Fullerton	28	.....	28
Santa Monica	11	17	28
Long Beach	58	.....	58
Santa Barbara	23	13	36
Auburn	.....	.....	.....
Bakersfield	10	.....	10
Le Grande	2	.....	2
Total	662	82	744

In addition to the 744 students here mentioned, 577 enrolled for post-graduate work, making a total of 1,331 students of all kinds in junior-college work. This year the enrolment is supposed to have increased a third again.

COMMUNICATIONS

To the Editor:

Permit me to correct a few of the many errors and misstatements concerning the *New Standard Dictionary*, and concerning me, that were printed in the November number of the *School Review*.

First: The statement is made that by including in its main vocabulary geographical and biographical names "the *New Standard Dictionary reverts to the type of omnium gatherum current in the eighteenth century till it was driven into obscurity by Dr. Johnson.*" The italicized words misstate the facts.

On p. 50 of another lexicographical work which I have before me, I find no less than twenty-one proper names, biblical, bibliological, biographical, and geographical. As this work was copyrighted in the year 1909—four years before the publication of the *New Standard*—it is clearly evident that the facts have been misstated.

Second: The statement, "for their [the consultors'] untutored intelligence the Greek alphabet is avoided," suggests that its author has overlooked the following: "Bearing in mind that a popular dictionary should aim to *provide* the *information* it contains *in easily accessible form*, words derived from languages whose alphabets differ in the forms of their letters . . . . are transliterated so as to be easily read" (*New Standard Dictionary*, p. xvi, column 2). By the editors of the *New Standard* this plan was consistently followed in regard to Arabic, Greek, Hebrew, Sanskrit, etc., and in this respect it differs from the other lexicographical work already referred to, which transliterates some but does not transliterate others.

Third: The suggestion that the *Oxford English Dictionary's* note on the etymology of "mystery" was ignored shows that the writer was not aware that this note was subsequently corrected as erroneous by the editor.

Fourth: The erroneous assertion is made that among other terms, some of which are of doubtful value, the following are unlisted: "hayrick," "continuance," "set down," "overwhelming." The first of these may be found on p. 1126, in column 2, line 22; the second on pp. 568, 569 (definitions 1 and 4); the third, on p. 2237, column 1; the fourth, under "overwhelm," of which it is the participle, on p. 1762, column 2, definition 4.

Fifth: One reads further: "It is pertinent to inquire why the *Standard's* editors have omitted so many familiar terms as the following: 'cutting' (ignoring an acquaintance); 'mission furniture,' the interjection 'mum,' 'musée,' 'out of sorts,' 'respecter of persons,' 'rhetorical question,' 'terrestrial paradise,' 'topic (or key) sentence.'" But the first, which is the present participle of "cut" (verb), is defined on p. 637, column 3, definition 13—"To encounter without salutation; affect not to know; pass intentionally without friendly recognition; ignore; as, *to cut an acquaintance*, etc."; the second is treated on p. 994, in column 2, with the other styles of *furniture;* the third is on p. 1630, column 1 (this may be either the imperative of the verb or a noun, but not, correctly, an interjection, although Dr. Bradley mistakenly so characterizes it in the *New English Dictionary*); the fourth is a French word pure and simple, of which the recognized English equivalent is "museum"; the fifth is on p. 1754 in column 2.

Sixth: The words attributed to me as managing editor I NEVER WROTE AND NEVER USED: "To gauge the work fairly one must bear in mind the managing editor's statement (*Journal of the Royal Society of Arts*, October 24, 1913, p. 1058) that forty workers, each with a packet of a hundred blank cards—one for each word—*compiled from dictionaries the definitions.*"

What I did write is: "In compiling the vocabulary, each word was copied on a separate and otherwise blank card, and the cards were strung together in packets of twenty-five. In this form four packets (100 words) were handed to a definer, who was responsible for the first work—the basis of the enterprise. With *dictionaries* immediately *before him*, usually seven in number, *and other reference books available, he created a definition that did not infringe the rights of any one of the books, to which, to avoid errors, he made constant and careful reference.* This work gave steady employment to forty definers."

I could continue at length, Mr. Editor, but fear to tax even your patience. Therefore, as to the remainder, I will briefly summarize:

Seventh: In the reference to "castle," verb, in chess, which it is claimed is "incorrectly defined," only the transitive sense is quoted; the nine-line definition of the intransitive sense that is used to support the claim of error, and which explains the point made, *is ignored.*

Eighth: "Terms not thoroughly Anglicized are entered without distinguishing mark." These are each grouped under a parent word which is characterized as *French* in each case.

Ninth: The claim that the specific meanings of *en passant* and *en prise* are not given is erroneous. Both are carefully and specifically defined in vocabulary place.

Tenth: The claim that letters are used in describing "rime royal stanza," but not in describing "ottava rima," or "Spenserian stanza" overlooks the fact that they are all given on the same page under "stanza" (p. 2366, column 1).

Eleventh: The statement that the *New Standard* defines "ottava rima" under "Faerie Queene" is misleading. There the statement is made that this poem is written in that meter "with an added Alexandrine line," which is correct. The term itself is defined on p. 1753.

Twelfth: "Under 'chess' we read, 'To commence a game the pieces *are* [*must be*] moved alternately'; in fact, the players alternately move, usually beginning not with a piece but with a pawn." This is a misquotation of the text, and the claim that a "pawn" is not a "piece" in chess is not borne out by the definition of "pawn" to be found in the *Oxford English Dictionary*, which reads, "One of the *pieces* of smallest size and value in the game of chess"; nor by that in the latest *Webster*, which reads: "*Chess.* The *piece* of least value. . . . ."

Thirteenth: "The knight is 'a major piece' under 'knight'; 'a minor piece' under 'chess.'" The definition of "knight" (p. 1361) reads, "a major piece having the supposed value of three pawns"; here the use of "major" clearly indicates the relation of knight to pawn; and the use of "minor," under "chess" (p. 461), clearly indicates the relation of bishop and knight to king, queen, or castle.

Fourteenth: The expression "to *keep* a woman" is defined on p. 1344, column 1, definition "*13* [Vulgar.] To support illicitly; as to *keep* a woman."

Fifteenth: The definition of "chemise" is correct. Being worn *under the corset*, it could not be "a combined corset cover and underskirt," which is commonly known as a "slip."

Sixteenth: "The claim to a single vocabulary order cannot be allowed since several classes of terms are listed out of order as phrases under verbs, compounds under prefixes, etc." The claim made will be found on p. xvi of the book itself: "The main purpose kept in view throughout this work has been to present its contents in such a way that the reader shall always have *direct* and *easy access* to the information he seeks. Therefore the plan of placing *all proper names*, whether biblical, classical, or personal, geographical or bibliographical, *in their alphabetical places*

in the main vocabulary was adopted, so that the reader may find the data he requires as readily and expeditiously as possible. This method is a distinct advance upon that formerly in vogue of giving in several separate alphabetical groups, various lists of proper names, classified as Bible, bibliographical, Greek and Roman, biographical, and geographical, often compelling the reader to turn to a number of these alphabetical groups, according to the plan of the work, before finding the information sought."

No claim is made above that can be applied to "phrases under verbs, compounds under prefixes, etc." which are grouped under the parent words by most dictionaries.

The readers of the *School Review* are referred to an anonymous letter which appeared in the *New York Tribune* of November 21, 1913, but no mention is made of the *exposé* that followed that letter in the same paper on November 28 and December 6. Further, the attention of the readers is directed to a letter that appeared in *Science*. Unfortunately, the writer of that letter also misquoted and misrepresented the *New Standard Dictionary*.

FRANK N. VIZETELLY

NEW YORK CITY

BOOK REVIEWS

An Introduction to the Study of Language. By LEONARD BLOOMFIELD. New York: Henry Holt & Co., 1914.

The aim of this book and the need of it is stated in the author's prefatory words, to which the reviewer heartily subscribes: "This little book is intended, as the title implies, for the general reader and for the student who is entering upon linguistic work. Its purpose is the same, accordingly, as Whitney's *Language and the Study of Language* and *The Life and Growth of Language*, books which fifty years ago represented the attainments of linguistic science, and, owing to their author's clearness of view and conscientious discrimination between ascertained fact and mere surmise, contain little to which we cannot subscribe today. The great progress of our science in the last half century is, I believe, nevertheless sufficient excuse for my attempt to give a summary of what is now known about language."

That the general reader needs such information as is here given was recognized by Whitney, who wrote in the preface of his first-named book: "It can hardly admit of question that at least so much knowledge of the nature, history, and classifications of language as is here presented ought to be included in every scheme of higher education. While questions of a linguistic nature are everywhere a frequent subject of discussion, it is surprising how little even educated people are in touch with the scientific study of language. I hope that my book will furnish a simple aid for those who choose to make up this deficiency in our scheme of general education."

To remark "how little even educated people are in touch with the scientific study of language" is but a mild allusion to a notorious situation which Professor Lounsbury has more pungently described as a "broad and deep level of linguistic ignorance" in England and America. It is not only possible but usual for a student to pass through high school and college without suspecting the existence of a science dealing with the general principles of language and without gaining any conception of what language really means as an institution or of its mechanism and manner of development. To suppose that such matter is too simple to need exposition or too difficult to be set before any but the most advanced students of language is equally erroneous. It is appropriate, in judicious employment, for the high school. Where? Not in connection with the Latin, French, or German courses, because none of these is pursued by all and, furthermore, the whole time is required to secure certain expected practical results. But in the years which every high-school student must devote to English there is surely room for one course in the English language which shall deal with something more than formal grammar and correct English and, while avoiding the most abstruse topics, shall give some elementary

notion of the physical basis of speech, of its relation to thought, of the proper function of spelling, of meaning, and finally the broad lines of the history of the English language. For such matters Whitney's books and such works as Greenough and Kittredge's *Words and Their Ways in English Speech* are invaluable helps and are still to be advised for first reading.

But there was need of a new presentation in English which should restate the problems from the point of view of most recent science. This has been accomplished in Dr. Bloomfield's book with competent understanding of present views and commendable skill in presenting them. Some chapters, no doubt, will prove more difficult reading, require more severe attention than any in Whitney's book. But by comparison with modern treatises like those of Paul or Wundt, the gain in lucidity is marked.

C. D. Buck

University of Chicago

The Industrial Training of the Girl. By William A. McKeever. New York: Macmillan, 1914. Pp. x+82. $0.50.

It is often a reproach to educators that they talk an esoteric language, dubbed by a joyous critic, "pedaguese." Another common defect not yet so happily named is their tendency toward a variety of sentimentality popularly known as "gush." This failing is usually induced by an obtuseness toward the humorous side of their profession and is perhaps best symbolized by the sickly sweetish smile assumed by many a Sunday-school teacher as an evidence of an angelic interior. At first it is merely ludicrous, but by and by it begins to wear. It is this kind of educational patter which drives virility out of the profession and leaves, in the popular estimate as a symbol of the school teacher, a strange, uncomfortable being halfway between the minister and mother on her high horse.

The present volume unfortunately cannot escape the reproach of an ultra-moral tone. Let us be honest and call it gush. Sentences that begin "Oh, how we wish for more ability to understand this precious inheritance" and glide saccharinely toward an exclamation point simply repel any virile American parent, to whom this volume is intended to appeal. Pictures of divinely perfect children, listening cherubically to a story, or sweeping the front porch, are more akin to the impossibly righteous juveniles of the eighteen-sixties than to modern education—especially when they are labeled, "Where love leads the way," or "A 'Little Mother' at her best." With the best of intentions Mr. McKeever has produced a handbook that reads like pedagogical cant.

The whole book is not quite so sugary as the opening chapters, and yet it is one of a type that does more damage to the profession of education than underpaid professors or mediocre schools. If educators are to win the sympathy of the public for their problems, they must present them in a masculine manner, in a vigorous, give-and-take fashion, with virility and earnestness and force and the entire absence of the gushing tone. Mr. McKeever has hold,

however unscientifically, of a real problem, but since he refuses to put it on a scholarly basis he cannot hope for a scholarly discussion of it by his colleagues or an appeal to the judicious public.

The book treats somewhat superficially, and with little reference to underlying principles, the industrial training of the girl from kindergarten to college. The author takes frequent liberty of discussing almost anything along the line of her career, however; thus the chapter on the high-school girl deals among others with democracy in the high school, the sorority, the burdens of intense study, and the high-school girl's clothes. The author has only himself to blame if the reader asks, What have these to do with industrial training? He makes a plea for credit for homework in the grades and—the best thing in the volume—for the parent-teacher association. A candid judgment, however, must pronounce that as a whole there is little excuse for this book.

A bibliography is appended to each chapter.

HOWARD M. JONES

UNIVERSITY OF CHICAGO

The History of English Literature. By A. S. MACKENZIE. New York: Macmillan, 1914.

The publication of a new textbook on English literature is not in itself an event. Unfortunately, in this country, teachers and publishers rush into print in a mad scramble for the school-book dollars. One feels that a new organization should be formed for the suppression of unnecessary textbooks. If such a scheme had been undertaken in time, Mr. Mackenzie would have been saved the expenditure of an enormous and valuable energy for an unworthy result.

The book is not hopeless; in places it has a small addition to make to our ordering of courses in literary history. Such is the emphasis upon the Gaelic spirit in English literature, the more firm recognition of the ballad and drama as great and interesting literary forms, and the attention given our modern writers, to whom some forty-five pages are devoted. The difficulty is that several books now on the market already cover most of the ground quite as well. In all of these works the instructor finds the quantity of unattached fact material almost unsurmountable, and his constant plea is for a simplified textbook. Mr. Mackenzie promises in his preface to achieve just this simplicity, but led on by his own wide reaching and catholic but well-grounded appreciation he soon wanders into details such as few textbook makers have recently grieved us with. Another difficulty is that one feels in his work a failure to appreciate the continuity of movements or forms and the fluidity of literature, as well as of other features of life; in another perspective the book lacks apt analysis and careful organization.

The method and style are likewise confusing. The first chapter, on the early Saxon period, opens with—in what seems a far-fetched attempt to connect with the life known to the student—a picture of the Colosseum and a

discussion of and reprint from Byron's "Dying Gladiator." Then in a sentence we learn that Byron was wrong in his feeling that the gladiator was a Goth, that he really was a Gaul of modern France, therefore a neighbor of the Britons and of the same Keltic family. Then we learn something of the Aryans and of the early Britons. Of the six test questions on the chapter one is this: "In what respects was an old Roman circus different from a circus of today? What circus scene did Byron have in mind when he wrote about the Dying Gaul?" The sentence style is likewise murky, confusing. For instance, take this passage:

"WHAT ARE RUNES?—In reading Anglo-Saxon literature we occasionally come across runes. Runic writing is a modification of the Latin alphabet. Marks that are not understood are mysterious, and so these strange symbols were called runes, which is simply the Anglo-Saxon word *rūn*, meaning "mystery" or "secret." Runes were forbidden by the church because of their connection with heathen magic, and we now employ the Roman or Latin alphabet in ordinary penmanship and printing." Well, what are runes?

"HOW LYRICS BEGAN.—At one time people sang because they were unusually sad or happy. There were no big cities, so everyone knew everyone else in his clan or village. Long ago a lyric, or song of feeling, consisted of two or three words chanted over and over again. When there was a holiday, every person sang and danced at the same time. When dancing began to go out of fashion, the lyric became a song of emotion, sung to the accompaniment of the lyre or some other musical instrument. After a time people began to do as we do. We still sing lyrics like "Auld Lang Syne," but most poems are not now written for singers."

"An allegory is a story that has two meanings, but it does not make animals talk as they do in fables."

How to Appreciate the Drama. By THOMAS LITTLEFIELD MARBLE. New York: Hinds, Noble & Eldridge, 1914.

The vitality of an art in any period can be gauged by the amount of discussion given to it over the dinner table, on the street cars, in the newspapers and magazines, and in the book publications. Judged by this standard drama today has a health, and therefore an influence, which it has never before enjoyed in English-speaking countries. This is a development peculiarly fortunate in America where civilization is emerging from those stages of necessarily whole-hearted devotion to material achievement, and where, if progress is to continue, an enlargement must come in aesthetic and spiritual vision such as the arts generate. Life has been made comfortable for us; now it must become rich and significant, if it is not to become flabby. However, whenever discussion is rife, only a portion is worthy of preservation. Most of the resultant criticism is mediocre or worse. The worse is usually kept from the press by the artistic or money standards of the publisher. Not so with the mediocre; some publisher can be found willing to speculate with it. Fortu-

nately dramaturgy has heretofore been handled largely by acknowledged specialists, such as George Baker, Clayton Hamilton, Richard Burton, Brander Matthews, William Archer, and many others. It was not to be expected that so beneficent a tyranny would continue. And it couldn't—as Mr. Marble's new book goes to prove.

There is nothing in Mr. Marble's book to hurt anyone—beyond its lack of stimuli; there is even some material of worth; but by and large it is immature and mediocre. The author seems not to be aware of the basic elements of drama or of the tendencies and progress in this form during the last few years. There are faults somewhat inexcusable in the light of the many excellent books on drama already in print. An example of what is meant will be seen in the treatment of the Greek unities. From the proportion of space given the material, one might think that the value of a play can be determined by the strictness of its adherence to the unities. Yet we now know that the Greek method was due to the inflexibility of the stage, not to a recognized principle of the art. Some material is more effective when treated without change of scene or lapse of days than is the other. Maugham and Kennedy usually find they can work with power under the Greek restrictions, Barker and Shaw and hosts of others that they cannot; yet we do not consider Shaw less an artist then Kennedy. The only deductions one can draw are that the modern age requires a simple, natural unity of total effect. Unity of action is therefore a necessity—but often only as a thread in which are caught up the essential unities of great art—unities that Mr. Marble fails to discuss—unity of theme, unity of atmosphere, and unity of character.

Analysis of individual plays forms two-thirds of the volume; to aid this line of study several plays are printed in significant parts or in entirety—a strange group to be sure, containing a dramatization of *The Cricket on the Hearth*, the trial scene from the *Merchant of Venice*, the screen scene from the *School for Scandal*, and a complete play of the author, called *Molly*. Yet the author's great fault is just his inability to analyze; he lacks, too, the reverse quality, a sense for organization. For instance, in a long outline analysis of *The Doll's House*, a play typical of the great modern school devoted to the revelation of ideas, of theme, or thesis, the theme gets this remarkable treatment: "The problem of woman's development is always a popular theme." The function of the Christmas tree has more attention; yet the structure of *The Doll's House* is dictated by the theme. One rather doubts if the author is even cognizant of theme individuality. In a suggested "program of study" comes the paragraph: "Does the theme appeal to popular taste? Name instances in which the audience is aware of a situation which is represented as unknown to certain of the characters."

Aside from the analysis of plays the book contains a chapter of perhaps fifteen hundred words tracing inadequately the development of drama forms through the Greek to the modern English development, a chapter on structural principles devoted largely to the above-mentioned unities and to plot,

a chapter on "Naturalness and Heightened Effects," and another on "Economy and Retention of Interest." None of these has peculiar value. It is pleasant, however, occasionally to run upon sentences that suggest the author's intimacy with the stage. His brief remarks about the value of music, of noise and commotion—matters never well treated—make one feel that he has made the mistake of choosing his neighbor's field in which to do his plowing. His own ground has a virgin richness ready for tilling. We have not yet, for instance, a worthy discussion of acting.

BALLOU

Elements of General Science. By OTIS W. CALDWELL, Head of the Department of Natural Science, and WILLIAM LEWIS EIKENBERRY, Instructor in the University High School, School of Education, University of Chicago. Boston: Ginn & Co., 1914. Pp. xix+308, illustrated, $1.00.

The foregoing book, which is an outgrowth of the experience during a period of six years with boys and girls in the first year of the high school, is a real contribution of the problem of general science teaching, at the present time—justly so—strongly advocated. The book is thoroughly teachable. For the young and inexperienced science teacher it is a guide which can be followed safely. For the experienced and resourceful teacher it is a suggestive outline open to modifications dictated by local conditions. The subject-matter is well selected, and the aim of the authors to unify such heterogeneous material as is offered by the various sciences and to establish coherence and progression in the various parts is successfully carried out. The final and culminating chapter enables the young student to understand his place in nature and shows him how self-education leads to the improvement of the race.

A. H. BERNHARD

STATE NORMAL SCHOOL
LACROSSE, WISCONSIN

School Costs and School Accounting. By J. HOWARD HUTCHINSON. Teachers College, Columbia University, Contributions to Education, No. 62. New York: Teachers College, 1914.

The study is divided into three parts. Part I, after indicating briefly the purposes of school accounting in general, presents an investigation into the methods employed by twenty city-school systems in Massachusetts, Connecticut, New York, and New Jersey. The investigation shows that in no city are the accounts handled in a way that will permit the determination of unit costs for the different kinds of services. This indicates that educational accounting, even in some of the most progressive eastern cities, is yet in a rather rudimentary state of development. The author points out the various defects in the accounting systems which prevent the use of the figures there given

for administrative purposes. Part II presents a description of the various documents employed in school accounting, such as requisitions, purchase orders, pay rolls, vouchers, the various ledgers, financial statements, etc., and explains the uses of each. These are descriptions of documents actually employed in certain of these twenty cities. Part III recommends in detail a complete system for school accounting. The items that should be found upon each of the various financial accounting documents are listed and sample forms are presented. The system recommended ought to secure the careful study of all educational administrators.

School Health Administration. By LOUIS W. RAPEER. New York: Teachers College, Columbia University, 1913. Pp. 360. $2.15.

This volume presents the results of a personal investigation on the part of the author into school-health problems and school-health agencies in twenty-five cities selected from forty actually visited in the course of the study. The study deals chiefly with medical inspection and supervision. Certain other phases are also treated; school sanitation, physical education, the teaching of hygiene in the public schools, and the hygiene of instruction.

The introductory section presents a summary of the study and of the findings as an aid to initial orientation on the part of the reader. Part I deals with the "National School Health Problem and How It Is Being Met." This is shown by the best available mortality and morbidity statistics, the results of medical examination of schools, insurance statistics, and many special investigations of the relation of health to school progress and economy of time in education. The inadequacy of our national-health care is well indicated by the figures presented.

Part II presents the detailed investigation into conditions and agencies in the twenty-five cities selected for the study. It appears to be the most elaborate study of this type that has been presented. The author discusses the nature of the organization in the different cities and points out favorable and unfavorable features. In elaborate statistical tables he exhibits the prevalency of the various defects and ailments in the cities studied.

The last section of the book, nearly seventy pages in length, develops a tentative standard plan for the administration of this health work, especially medical inspection, with necessary blank forms such as health-record cards, reports of physicians, nurses, etc. The plan suggested is worthy of careful study.

J. F. BOBBITT

UNIVERSITY OF CHICAGO

BOOK-NOTES

Believing that the readers of the *School Review* will benefit more from a concise statement of what is in a textbook than by the mere mention by title of such a volume as a "book received," the editors will next month replace the department of Books Received by the department of Book-Notes. Books of primary importance, as heretofore, will be discussed in the review columns. Books which seem to be of secondary importance will be found under Book-Notes.

NEFF, THEODORE LEE (editor). *Bazin's "Le Blé qui leve."* New York: Henry Holt & Co., 1914. Pp. xxv+300.

This text should be of assistance to the high-school teacher or college instructor who believes that a love of French can best be inculcated in the earlier years by a study of contemporary writers. The simplicity and straightforwardness of Bazin make him a charming interpreter of country life, and form a needed corrective to the popular idea of French domesticity as described in the Parisian novel, a notion, the results of which are so amusingly set forth in Brieux's play, *La Française*.

To reduce the text to the possibilities of the classroom the editor has omitted "all the chapters relating to the hero's experience in Belgium, more especially the chapter that relates his conversion." The preface has exactly the right balance for the introduction of a class to a contemporary author. Bazin's life is quickly sketched; the main body of Professor Neff's essay is taken up with an exposition of his author's artistic and social aims. Thus he has an excellent condensation of Bazin's theory of the novel, and another section on "How M. Bazin Carried Out His Literary Ideals." It is possible that the understanding of these sections assumes a larger acquaintance with the realistic school and the French novel in general than a high-school class would have. A vocabulary and notes are provided. It is to be regretted that so good a text should be illustrated by such poor pictures; all but the portrait of M. Bazin might better have been omitted.

BERGEN, THOMAS D., and WESTON, GEORGE B. *An Italian Reader of Nineteenth Century Literature.* With vocabulary. Boston: Ginn & Co., 1914. Pp. viii+236. $1.00.

This reader is intended for college students beginning Italian, though it should prove useful for high schools where Italian is offered. The compilers have attempted to "aim at the acquirement of a first-hand knowledge of the modern literary idiom," and might properly leave for later study authors like Alfieri and Goldoni. The selections are brief, the longest running to eight pages. Prose and poetry are represented; the selections in prose including *De amicis*, Fucini, Fogazzaro, Villari, and among the poets, Leopardi, Sestini, and Marradi. A paragraph of biographical criticism precedes each selection. The notes are direct and concise.

BESHGETURIAN, AZNIV. *Foreigner's Guide to English.* Yonkers-on-Hudson: World Book Co., 1914. Pp. xi+268.

This is a very interesting book, one which springs from the author's own experiences in teaching English to foreigners. Even apart from its value in a night school, as a human document the perspicacious reader will find it entertaining. To teachers

of foreigners it should prove very useful; to any instructor in elementary language-work it ought to be a mine of hints on English.

The first lessons are made simple "with results that may be readily seen by teacher and pupil alike." An abundance of simple illustrations is used to define words. Emphasis is laid on peculiarities in our speech likely to trouble foreigners in common conversation—the vagaries of the verb "to be," the use of auxiliaries, idiomatic use of prepositions, and so on. The more advanced lessons deal with things near at hand—the city government, the police, the country ("Not all the people in America live in the cities," runs the first sentence, indicative of the power of the author to meet the immigrant's point of view), simple health rules, marketing, public signs, etc. A plain, practical book, but, like abnormal psychology, one that illuminates the normal by the freshness and oddity of its approach.

COVILLE, MARION E. *An Appeal against Slaughter.* Syracuse: C. W. Bardeen, 1914. Pp. 161.

Another Bardeen publication, apparently on vegetarianism. Worthless.

CERF, BARRY (editor). *Daudet's "Tartarin de Tarascon."* With vocabulary. (International Modern Language series.) Boston: Ginn & Co., 1914. Pp. xxx+204. $0.45.

This is another volume in the excellent Modern Language series. For the first time the delicious *Tartarin* is made accessible to students in a properly annotated, and yet a complete, edition. Professor Cerf's introduction is admirably fair in its critical estimate of Daudet's life and writings; his notes are full, and he deals adequately with the sprinkling of Tarrasconais provincialisms which serve as pepper to Daudet's dish. One commendable feature of the editing is the cross-reference between vocabulary and notes. As a literary masterpiece, of course, *Tartarin* is worth the study; but it ought to find a place in any class sufficiently advanced because it is royal good fun. There is no reason why a language class should be exclusively devoted to dignified and sometimes stupid masters; Professor Cerf's timely contribution offers a chance to liven up the dullest recitation.

ELMSLIE, W. A. L., and SKINNER, JOHN (editors). *Isaiah XL–LXVI.* Cambridge: University Press, 1914. Pp. xxxiii+137. 1*s.* 6*d.*

This is another text in the Cambridge series of the Revised Version of the Bible for schools and the second volume of the two into which Isaiah is divided. It contains the usual scholarly introduction, dealing with questions of textual, aesthetic, and religious criticism. The notes are placed at the bottom of the page; their extent can be guessed from the fact that they usually occupy about one-half of the page. Excellent for schools in which biblical study is a part of the curriculum.

GREENE, GEORGE G. *Workshop Note-Book: Woodworking.* Peoria: Manual Arts Press, 1914. 24+blanks. $0.25.

A combination of notebook and text in woodworking. Intended for practical shop use in an elementary course.

HALL, GUILLERMO. *All Spanish Method, First Book.* Yonkers-on-Hudson: World Book Co. Pp. xxix+280.

This is a practical first book in Spanish in the direct method. It might be available for individual study, but seems to require a teacher. The author has aimed to

make the students talk Spanish; to this end the lessons deal with practical, everyday things of home, street, store, and office. Of the 4,500 words in the vocabulary, he declares that 4,000 are of this class; he aims to avoid the far too common weakness of a badly selected vocabulary, impractical for linguistic purposes. Everything is given in Spanish excepting what few English directions were absolutely necessary. There are twenty-four lessons, each divided into a conversational and a written exercise. At the end a "manual de inflexiones" of 28 pages is appended. The book is workmanlike and ought to be a very practical handbook for classroom use.

THOMPSON, GARRETT W. (editor). *Hauff, Lichtenstein.* With Vocabulary. (International Modern Language series.) Boston: Ginn & Co., 1914. Pp. xxii+566. $0.90.

Professor Thompson's edition makes accessible a German literary classic which, although popular in Germany, has been little known in America. His introduction sketches the life of the author, but unfortunately makes little attempt at a critical appraisal of the novel. While *Lichtenstein* is not difficult German, it may be questioned whether its somewhat formidable length, although here abridged (the text occupies 412 pages in this edition), does not preclude its use for the ordinary high-school recitation. This volume might well serve for rapid reading in somewhat advanced classes or for reading outside of class in a survey course. Mr. Thompson provides 27 pages of composition exercises based on the text. The notes, though sparing, seem to be adequate.

KENNEDY, JOHN. *The Batavia System of Individual Instruction.* Syracuse: C. W. Bardeen, 1914. Pp. 307. $2.00.

This is a beautiful example of how not to put out a book. The volume is wretchedly manufactured, on cheap paper, and poorly bound in just the wrong shape. The content is palpably stuffed with "recommendations" of the Batavia system of varying authority, ranging from a newspaper write-up to opinions of visiting superintendents; what is the author's own seems to be a pot pourri of extracts from other articles and addresses by him on the same subject. Whatever the merits of the Batavia "system," the present presentation of it would repel any judicious reader. The "system" of individual instruction set forth, which is well enough known in other places than Batavia, might make a fair pamphlet, but a volume it emphatically does not. As a book it approaches perilously near to an attempt to defraud.

KINGSLEY, CHARLES. *The Heroes.* Cambridge: University Press; New York: Putnam, 1914. Pp. 157.

A cloth-bound printing of the text, without notes or introduction. A pronouncing dictionary of proper names is appended.

WEATHERHEAD, T. C. (editor). *Livy, "The Revolt and Fall of Capua."* Being selections from Livy xxiii-xxvi. Cambridge: University Press; New York: Putnam, 1914. Pp. xli+166. $0.50.

Mr. Weatherhead's selections are intended for students beginning Livy and are based on the idea that it is by no means a bad scheme to present the most interesting part of a difficult author first to catch the interest of the class. His is intended as a transition text from Caesar to Livy, but he has happily attempted no "simplication"

of his author. A vigorous introduction sets forth the historical data necessary to an understanding of the history, followed by a chronological table of the Punic wars. Omitted passages in the text are summarized in brief inserted English paragraphs. The notes are chiefly devoted to passages grammatically difficult; an index of the constructions explained in the notes is supplied, followed by a vocabulary. A very workmanlike text.

MIRICK, GEORGE A. *The Teaching of Reading.* Trenton: New Jersey Department of Public Instruction. Pp. 96.

A scholarly study of all the branches of teaching reading. Designed for New Jersey school teachers.

MOORE, ELIZABETH, TOMPKINS, DORA GILBERT, MACLEAN, MILDRED. *English Composition for College Women.* New York: Macmillan, 1914. Pp. xi+314. $1.25.

A welcome book, based upon innovations in teaching English. It is founded upon the demands made by the home, by the club, by society upon women. It is filled with new and refreshing models of the best kinds of literature. It is worthy of a thorough trial in any class of first-year college women.

SAMPSON, R. A. *The Sun.* Cambridge: University Press; New York: Putnam, 1914. Pp. 141. $0.40.

This volume is No. 81 in the Cambridge Manuals of Science and Literature series. It aims "to provide, for the general reader, within the compass permitted, something like a report upon the present position of fact and theory relating to the sun." The first chapter deals popularly with the aim and method of scientific research and hints at the history of solar astronomy. The content of the book is evident by the chapter headings: "The Sun's Output of Heat," "The Sun as the Mechanical Centre of the World," "The Spectroscope," etc. The book is illustrated, and a selected bibliography is added as an inducement to further reading. The style and weight of this discussion fits it very well for the high-school library where astronomy, as a matter of outside reading, is a usually neglected but always fascinating field.

SCOTT, FRANKLIN WILLIAM, Assistant Professor of English, University of Illinois, and ZEITLIN, JACOB, Associate in English, University of Illinois. *College Readings in English Prose.* New York: Macmillan, 1914. Pp. xiii+652. $1.25.

Six hundred pages crammed full of illustrative material in all forms of composition. Valuable as a reference book for models, most of which are new, selected from modern writers or speakers.

BOOKS RECEIVED

EDUCATION

Ferrell, John A. The Rural School and Hookworm Disease. U.S. Bureau of Education, Bulletin, 1914, No. 20. Whole Number 593. Washington: Government Printing Office, 1914. Pp. 43+iv.

Foght, H. W. The Danish Folk High Schools. U.S. Bureau of Education, Bulletin, 1914, No. 22. Whole Number 595. Washington: Government Printing Office, 1914. Pp. 93+iv.

Forbush, William Byron. Manual of Play. Philadelphia: George W. Jacobs & Co., 1914. Pp. 353. $1.50.

Glynn, Frank L. Some Trade Schools in Europe. U.S. Bureau of Education, Bulletin, 1914, No. 23. Whole Number 596. Washington: Government Printing Office, 1914. Pp. 76+iv.

Hodges, W. T. Important Features in Rural School Improvement. U.S. Bureau of Education, Bulletin, 1914, No. 25. Whole Number 599. Washington: Government Printing Office, 1914. Pp. 52+iv.

Kennedy, John. The Batavia System of Industrial Instruction. Syracuse: C. W. Bardeen, 1914. Pp. xxi+299. $2.00.

Learned, William Setchel. The Oberlehrer, A Study of the Social and Professional Evolution of the German Schoolmaster. Cambridge: Harvard University Press, 1914. Pp. xiv+150.

Morehouse, Frances M. The Discipline of the School. Boston: D. C. Heath & Co., 1914. Pp. xviii+342. $1.25.

Report of the Commission on National Aid to Vocational Education [with hearings]. Vol. 1. 63d Cong., 2d sess. H.R. Doc. No. 1004. Washington: Government Printing Office, 1914. Pp. 207.

ENGLISH LANGUAGE AND LITERATURE

Abbott, Herbert Vaughan. Addison and Steele: Selections from The Tatler and The Spectator. New York: Scott, Foresman & Co., 1914. Pp. 360. $0.35.

Baldwin, Charles Sears. English Medieval Literature. New York: Longmans, Green & Co., 1914. Pp. xii+261.

Bates, Herbert. Coleridge's The Rime of the Ancient Mariner, Christabel and Kubla Kahn. New York: Longmans, Green & Co., 1914. Pp. xl+88. $0.25.

Beshgeturian, Azniv. Foreigner's Guide to English. Yonkers-on-Hudson: World Book Co., 1914. Pp. xi+268.

Black, Ebenezer Charlton. Much Ado about Nothing ("New Hudson Shakespeare"). Boston: Ginn & Co., 1914. Pp. lxi+139. $0.50.

Bloomfield, Leonard. An Introduction to the Study of Language. New York: Henry Holt & Co., 1914. Pp. x+335.

Blount, Alma, and Northrup, Clark Sutherland. An English Grammar for Use in High and Normal Schools and in Colleges. New York: Henry Holt & Co., 1914. Pp. xii+375. $0.80.

Briggs, Thomas H. A Laboratory Manual of Letters. Boston: Ginn & Co., 1914. Pp. viii+94. $0.25.

Brooke, Tucker, Cunliffe, John William, and MacCracken, Henry Noble. Shakespeare's Principal Plays. New York: Century Co., 1914. Pp. 957. $3.00.

Cairns, William B. American Literature for Secondary Schools. New York: Macmillan, 1914. Pp. xiii+341. $1.00.

Foerster, Norman, and Howe, Will David. Selected Literary Essays from James Russell Lowell. Cambridge: Houghton Mifflin Co., 1914. Pp. xviii+312. $0.60.

Fuess, Claude M. Selected Essays. Cambridge: Houghton Mifflin Co., 1914. Pp. xiv+219. $0.40.

Griffin, Nathaniel Edward. The Sir Roger de Coverley Papers from The Spectator ("English Readings for Schools"). New York: Henry Holt & Co., 1914. Pp. xxxvii+204.

Lansing, Marion Florence. Dramatic Readings for Schools, A Practice Book in Dramatics. New York: Macmillan, 1914. Pp. x+242. $0.50.

Mackenzie, A. S. History of English Literature. New York: Macmillan, 1914. Pp. xx+477. $1.10.

Marble, Thomas Littlefield. How to Appreciate the Drama. New York: Hinds, Noble & Eldredge, 1914. Pp. 285. $1.25.

Neilson, William Allan. Shakspere's Romeo and Juliet. New York: Scott, Foresman & Co., 1914. Pp. 214. $0.25.

Salmon, David. Macaulay's Essay on Frederic the Great. London: Longmans, Green & Co., 1913. Pp. xxxiv+133. $0.65.

Skinner, Ada M. Dramatic Stories for Reading and Acting. New York: American Book Co., 1914. Pp. 224. $0.35.

Winchester, C. T. A Book of English Essays. New York: Henry Holt & Co., 1914. Pp. xiv+405.

Young, Ella Flagg, and Field, Walter Taylor. The Young and Field Literary Readers. Book Three, Pp. 288. $0.48. Book Four, Pp. 320. $0.52.

ARTS AND SCIENCES

Beardslee, C. S. Abraham Lincoln's Cardinal Traits, A Study in Ethics. Boston: Richard G. Badger, 1914. Pp. 244.

Caldwell, Otis W., and Eikenberry, William Lewis. Elements of General Science. New York: Ginn & Co., 1914. Pp. xiv+308. $1.00.

Calvert, W. J. Prevention of Contagious Diseases in School Children. The University of Missouri Bulletin, Medical Series, Vol. I, No. 3. Columbia: University of Missouri, 1913. Pp. 30.

Calvert, W. J. The Prevention of Typhoid Fever. The University of Missouri Bulletin, Medical Series, Vol. I, No. 1. Columbia: University of Missouri, 1913. Pp. 37.

Colton, Buel P., and Murbach, Louis. Briefer Physiology and Hygiene with Practical Exercises. Boston: D. C. Heath & Co., 1914. Pp. x+387. $1.00.

Conley, Emma. Principles of Cooking. New York: American Book Co., 1914. Pp. 206. $0.52.

Cook, Charles G. Practical Chemistry for High School Students. New York: D. Appleton & Co., 1914. Pp. xiii+366. $1.25.

Dolley, D. H. On Resuscitation. The University of Missouri Bulletin, Medical Series, Vol. I, No. 4. Columbia: University of Missouri, 1913. Pp. 29.

Drake, Durant. Problems of Conduct, An Introductory Survey of Ethics. Boston: Houghton Mifflin Co., 1914. Pp. xiii+455. $1.75.

Edelman, Philip E. Experiments. Minneapolis: Philip E. Edelman, 1914. Pp. 256. $1.50.

Hunt, Thomas Forsyth, and Burkett, Charles William. Farm Animals, Covering the General Field of Animal Industry. New York: Orange Judd Co., 1914. Pp. ix+534.

Jewett, Frances Gulick. The Next Generation. Boston: Ginn & Co., 1914. Pp. xi+235. $0.75.

Millikan, Robert Andrews, Gale, Henry Gordon, and Bishop, Edwin Sherwood. A First Course in Laboratory Physics for Secondary Schools. New York: Ginn & Co., 1914. Pp. vi+135. $0.50.

Mitchell, O. W. H. Bacteria and Disease. The University of Missouri Bulletin, Medical Series, Vol. I, No. 1. Columbia: University of Missouri, 1913. Pp. 39.

Mitchell, O. W. H. The Prevention of Tuberculosis. The University of Missouri Bulletin, Vol. XV, No. 9, Medical Series 6. Columbia: University of Missouri, 1914. Pp. 36.

Mitchell, O. W. H. Water—The Prevention of Its Pollution. The University of Missouri Bulletin, Vol. XV, No. 21, Medical Series 7. Columbia: University of Missouri, 1914. Pp. 18.

Münsterberg, Hugo. Psychology, General and Applied. New York: D. Appleton & Co., 1914. Pp. xiv+487. $1.75.

Newell, Lyman C. General Chemistry. Part I. Principles and Applications. Boston: D. C. Heath & Co., 1914. Pp. vi+174.

Noyes, Guy L. The Relation of Sight and Hearing to Early School Life. The University of Missouri Bulletin, Vol. XV, No. 3, Medical Series 5. Columbia: University of Missouri, 1914. Pp. 34.

Payne, Arthur F. Art Metalwork with Inexpensive Equipment. Peoria: The Manual Arts Press, 1914. Pp. 186. $1.50.

School and Home Gardening for Use in Primary Grades. Bulletin No. 31 (Revised) of the Bureau of Education. Manila: Bureau of Printing, 1913. Pp. 115.

Smith, Alexander. A Laboratory Outline of Elementary Chemistry. New York: Century Co., 1914. Pp. [10]+137.

CURRENT EDUCATIONAL LITERATURE IN THE PERIODICALS

IRENE WARREN
Librarian, School of Education, University of Chicago

Baldwin, Bird T. The normal child, its physical growth and mental development. Pop. Sci. Mo. 85:559–67. (D. '14.)

Beard, Frederica. Ethical standards in the high school. Educa. R. 48:444–51. (D. '14.)

Cooley, Edwin G. Bishop Grundtvig and the people's high school. Educa. R. 48:452–66. (D. '14.)

Cooper, Clayton Sedgwick. Domination of athletics. Educa. 35:129–39. (N. '14.)

Cummings, Robert A. A study of defective pupils in the public schools of Tacoma, Washington. Psychol. Clinic 8:153–69. (N. '14.)

Hawes, James Anderson. The collegiate side shows. Educa. R. 48:433–43. (D. '14.)

Hayes, Edward C. Education for personality. Educa. R. 48:475–86 (D. '14.)

Hill, David Spence. Educational research in New Orleans. J. of Educa. Psychol. 5:499–510. (N. '14.)

Keech, Mabel L. House-keeping as a public school study. Educa. 35:164–66. (N. '14.)

Klapper, Paul. Efficiency in class instruction. Educa. R. 48:498–513. (D. '14.)

Phelps, Alice Starkey. What shall we eliminate from the high school course? Educa. 35:140–42. (N. '14.)

Pintner, Rudolf. A comparison of the Ayres and Thorndike handwriting scales. J. of Educa. Psychol. 5:525–36. (N. '14.)

Rapeer, Louis W. Industrial hygiene and vocational education. Educa. R. 48:467–74. (D. '14.)

Sanders, Frederic W. The organization of education. Educa. 35:178–83. (N. '14.)

Shreves, Rolland M. The psychologist in the class room. Educa. 35:152–56. (N. '14.)

Thorndike, Edward L. The foundations of educational achievement. Educa. R. 48:487–97. (D. '14.)

Wallin, Wallace J. E. The hygiene of eugenic generation. Psychol. Clinic 8:170–79. (N. '14.)

Warren, Irene. Teaching the use of books and libraries. Educa. 35:157–63. (N. '14.)

Weiss, A. P. A modified slide rule and the index method in individual measurements. J. of Educa. Psychol. 5:511–24. (N. '14.)

Wyer, James I. Text-books and some others. J. of Educa. (Bost.) 80:427–28. (5 N. '14.)